FIVE STUDIES ON THE ANTECEDENTS OF PREFERENCE AND CONSUMER CHOICE

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von

Master of Science Jana Luisa Diels

Präsident der Humboldt-Universität zu Berlin:

Prof. Dr. Jan-Hendrik Olbertz

Dekan der Wirtschaftswissenschaftlichen Fakultät:

Prof. Dr. Ulrich Kamecke

Gutachter:

1. Prof. Dr. Lutz Hildebrandt (Humboldt-Universität zu Berlin)

2. Prof. Dr. Daniel Klapper (Humboldt-Universität zu Berlin)

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1 INTRODUCTION

1.1 Research Focus and Main Research Objectives

An extensive body of literature to date documents how the inclusion of new items into a choice set systematically affects individuals' relative preference ordering and resulting choice decisions (e.g., Huber, Payne, & Puto, 1982; Simonson, 1989; Tversky, 1972). Yet, there is still a considerable lack of research in the investigation of how customers' choices evolve when preferred options no longer form part of a choice set, i.e. are unavailable. This is despite the fact that the unavailability of products represents one of the three largest customer irritations in stationary retailing (ECR Europe & Roland Berger, 2003) and still constitutes a considerable source of loss for both retailers and manufacturers (Gruen & Corsten, 2008).

Unavailability can be permanent in nature, for instance when retailers decide to delist certain products from their assortment (e.g., Boatwright & Nunes, 2001; Broniarczyk, Hoyer, & McAlister, 1998; Campo, Gijsbrechts, & Nisol, 2004; Mao, Luo, & Pratap Jain, 2009) or when manufacturers streamline the offered product range in order to concentrate on strong brands and minimize inter-brand cannibalization (Kumar, 2003; Unilever, 2002). In addition, unavailability can be temporal when for some continuous time period an article is not for sale as intended (Gruen & Corsten, 2008). These temporal situations of product shortage, so-called out-of-stock (OOS) situations, may occur due to inaccurate store forecasting and ordering techniques or incorrect shelf replenishment processes (Corsten & Gruen, 2003) which unexpectedly confront customers with empty shelf spaces. Although the OOS problem has been considered very important for decades (Aastrup & Kotzab, 2010), and in-store logistics have undergone extensive technological advancements, stock-outs still represent a regular phenomenon for shoppers with average OOS rates ranging from 7% to 10% (ECR Europe & Roland Berger, 2003) in brick-and-mortar settings. These rates can be expected to be even more pronounced in virtual shopping environments, where demand is highly fluctuating (Fitzsimons, 2000; Rayport & Jaworski, 2001) and stock-outs seem ineluctable (Dadzie & Winston, 2007). Apart from being a source of indirect costs through reduced customer satisfaction and declining store and brand loyalty (Fitzsimons, 2000), stock-outs directly impact retailers' and suppliers' profits with sales losses of up to 4% (Gruen & Corsten, 2008).

Over 40 years of OOS research has established that OOS affected customers show a high tendency to replace unavailable products with other items of the same or a different brand in the retail assortment (e.g., Campo, Gijsbrechts, & Nisol, 2000; Corsten & Gruen, 2003; ECR Europe & Roland Berger, 2003; Sloot, Verhoef, & Franses, 2005). Accordingly, shoppers are less likely to switch the store or cancel the purchase altogether when they do not find the desired item on the shelf. From a retailer's perspective, this implies that the cost of understocking, i.e. the costs of OOS, might even fall behind the costs of overstocking, i.e. stocking unnecessary inventory (Aastrup & Kotzab, 2010). Yet, although substitution is identified as the dominant OOS response and stocking adequate substitutes can be considered crucial for retailers to prevent OOS affected customers from leaving the store, OOS research so far lacks a theory to elucidate which replacement item will eventually be selected.

Research on context-dependent preferences offers a valuable theoretical foundation to explain OOS-induced substitution patterns, thereby making them predictable and controllable for retailers. Particularly, and in sharp contrast to the assumptions of rational choice theory, it is argued that customer choice does not necessarily follow value-maximization principles but that instead preference formation is constructive and shaped by the properties of the decision environment (Bettman, Luce, & Payne, 1998; Bettman & Zins, 1977; Murray & Häubl, 2005; Payne, Bettman, & Johnson, 1992). In this regard, numerous studies have demonstrated that preferences for an option do not merely depend on the features of that option alone but rather result from comparisons drawn with other alternatives in a given choice set (e.g., Heath & Chatterjee, 1995; Hildebrandt & Kalweit, 2008; Huber et al., 1982; Huber & Puto, 1983; Simonson, 1989; Tversky & Simonson, 1993). This set of options under consideration is referred to as the decision 'context' (Simonson & Tversky, 1992), which, in turn, has been shown to induce particular choice patterns subsumed under the notion of 'context effects'. An underlying theme of these context effects is that alterations in customers' relative preferences can be induced by changes in the composition and dominance structure of the choice set, e.g. by introducing or excluding choice alternatives with different distinct characteristics. Against this background, even unavailable items may lead to disproportionate changes in individuals' preference ordering although these items constitute phantom options (Pratkanis & Farquhar, 1992), which are impossible to select.

So far, the specific influence of phantoms on preference formation and choice has been the focus of only a limited number of empirical studies (e.g. Hedgcock, Rao, & Chen, 2009; Highhouse, 1996; Pettibone & Wedell, 2000, 2007; Scarpi & Pizzi, 2012). These studies

commonly apply between-group designs where choice shares of individuals seeing a full choice set are contrasted against those of individuals being confronted with a reduced set, inclusive of a phantom alternative. Due to this experimental set-up, the attained results do not allow for direct inferences on how customers' preferences evolve when formerly preferred choice options unexpectedly become unavailable. By applying within-subject designs where participants are to choose twice, once before and once after the stock-out, a deeper and more realistic understanding of OOS-induced substitution patterns can be generated. Likewise, the generalizability of the aforementioned results is challenged by the prevalent employment of simplified experimental designs, where individuals' choice decisions between fictitious brands (e.g., named A, B and C) remain fully imaginative, i.e. hypothetical. As such, test persons do not face any post-choice obligations of their decisions in that they are not made to really buy or pay for the selected items. Since recent empirical evidence suggests that the efficacy of choice set composition on individuals' preference ordering is prone to overestimations in purely hypothetical choice settings (Müller, Kroll, & Vogt, 2012b), the need to study context-dependent preference formation in more realistic choice environments, inclusive of real payments, is emphasized. Additionally, phantom research so far neglects that the general assessment of the importance of an attribute differs between decision makers and the respective items to be purchased (Malaviya & Sivakumar, 1998). Since, however, phantoms have been proven to systematically impact preferences by changing the relative value attached to the considered attributes dimensions (Hedgcock et al., 2009; Pettibone & Wedell, 2000, 2007), questions arise as to whether they affect the preference structure of different decision makers in equal measures or if their relative influence varies contingent on individuals' predisposed perceived attribute weights.

Apart from the theoretical implications of phantom research, the recognition that retailers and manufacturers are not necessarily required to reposition extant products, but may instead induce shifts in market share by excluding certain articles from their assortment, is also relevant from a marketing strategy perspective. Yet, only few studies analyze the specific role of product unavailability as marketing variable (e.g., Gierl, 2008; Kramer & Caroll, 2009) and, further, the particular interplay with other marketing instruments, e.g. promotions or product recommendations. Since, though, both phantoms as well as different marketing variables alter the overall decision context and might often – voluntarily or involuntarily – occur simultaneously, e.g. when promoted items are OOS or when retailers give recommendations for substitutional articles, their interacting effect on preference formation

seems worth studying. This way, the knowledge on customers' decision making in altered decision contexts can be substantially broadened, allowing for the deduction of crucial guidelines for retailers' general assortment planning, their OOS management and the overall marketing strategy.

However, in today's retailing landscape, not only customers but also marketers themselves are constantly confronted with new and changing decision contexts and market conditions. As an example, customers' demand and preference for organically produced items has undergone a substantial rise over the last decade (Willer, Lernoud, & Home, 2013), making offering organic products a key premise for marketers to survive in today's fierce retailing competition. Despite its strategic importance, the understanding of how customers actually make their decisions vis-à-vis organic products though still remains elusive. This is because extant research pertaining to the analysis of customers' green preference drivers mostly has qualitative character or is based on individuals' reported purchase intentions. Since self-explicated intentions must not necessarily transform into real purchase behavior, the predictive power of the so far attained results and the deducted implications for marketing practice are challengeable. Consequently, retailing research still has demand for an analysis of real purchase data to gain a more thorough and realistic understanding of what explains customers' relative preferences for organic over non-organic products.

While generating valuable insights, OOS research as well as research on context-dependent preferences leave a number of issues uncovered; six of which form the main research objectives this thesis endeavors to approach.

Research objective 1:	*Employ context and phantom theory to explain OOS-induced preference shifts and resulting substitution patterns in a theory-based way.*
Research objective 2:	*Apply within-subjects designs to study individual switching behavior after OOS incidents.*
Research objective 3:	*Investigate the influence of experimental choice settings, i.e. hypothetical and binding decision environments, on the efficacy of choice set composition on preference formation.*
Research objective 4:	*Examine the moderating influence of individually assigned attribute weights on OOS-induced preferences and substitution patterns.*

Research objective 5: *Analyze the designated interplay of phantoms, promotions and recommendations on relative preferences and substitution decisions.*

Research objective 6: *Determine preference drivers for organic products by means of real purchase data analysis.*

1.2 Structure and Outline

This thesis is composed of five autonomous essays addressing the delineated limitations of extant research on the antecedents of preference formation and consumer choice thereby generating important insights for marketing and decision-making research. Particularly, essays 1, 3 and 4 address *research objective 1*, in that they use context and phantom theory to explain and predict OOS-induced substitution patterns in a theory-based way. Essays 1 and 3 additionally respond to *research objective 2* by studying within-subject switching behavior subsequent to OOS-incidents. Further, essays 2 and 3 relate to *research objective 3* by assessing the specific influence of hypothetical and binding choice settings on the strength of the provoked context effects. *Research objective 4* is tackled by essay 4 in that it analyzes the influence of individual differences in assigned attribute weights on phantom-induced preference shifts. Essays 1 and 4 attend to research *objective 5* by considering the interactive effect of phantoms and different marketing variables to alter preferences for substitutional items. Finally, *research objective 6* is addressed by essay 5 in which drivers of individuals' preference for organic products are studied using real purchase data.

The main objective of **Essay 1**[1] is to enhance the understanding of substitution decisions subsequent to OOS situations by coevally considering the relevance of promotions to moderate these decisions. We use context and phantom theory to deduct our hypotheses on how customers' preferences shift when formerly preferred choice options are no longer available. The results of two comprehensive online studies corroborate the contention that phantoms, as well as price promotions, lead to alterations in the composition and overall dominance structure of the choice set, thereby inducing shifts in the preference ordering contrary to the assumptions of classic economic theory. Particularly, study 1 finds that in OOS situations with non-dominating choice options and without promotion, substitution

[1] Diels, Wiebach, & Hildebrandt (2013), *Journal of Retailing and Consumer Services* (forthcoming).

patterns correspond to a reversed similarity effect (*RSE*) in that customers primarily choose substitutes which resemble the formerly chosen preference product on the considered attributes. Yet, when the OOS occurs for an article on promotion, the strength of the *RSE* is reduced due to the promotion-induced alteration in the relative dominance structure of the choice set. Further, the results of study 2 reveal that promotions of similar substitutes increase the strength of the *RSE* in OOS situations of preferred items, as the similar substitute becomes a clearly dominating choice option. Yet, when dissimilar substitutes are promoted at the time the preferred product is stocked out, the *RSE* is offset by the simultaneous occurrence of an attraction effect.

Essay 2[2] attends to recent findings in decision-making research indicating that, as opposed to choices under hypothetical settings, context effects are significantly attenuated in binding choice environments that include real payments for products (Müller et al., 2012b). Drawing on this, we investigate whether this applies to yet another context effect, namely the similarity effect (*SE*), stating that the inclusion of new items into choice sets predominantly lowers choice probabilities of similar choice options (Tversky, 1972). We test our hypothesis by means of a comprehensive online study with an enhanced experimental design resembling purchase decisions in real marketplaces inclusive of branded choice options and payment obligations for test persons. Our analysis shows that compared to binding choice scenarios, the mean increase in relative choice share of the similar substitute is significantly accentuated when subjects' choices are hypothetical and do not require real payments, hence supporting the hypothesized interactive effect of choice setting and choice set composition.

Essay 3[3] represents an extension of essay 1 in that it aims to corroborate the existence of the reversed similarity effect (*RSE*) - as individuals' tendency to disproportionally prefer alternatives that are perceived similar to a first-choice option in reduced choice sets - under market-like conditions. To this end, we observe within-subjects choices under different OOS conditions in an experimental design that come as close as possible to realistic shopping transactions inclusive of real brands and binding payments for test persons. The results of two online-studies prove the robustness of the *RSE* even in market-like shopping scenarios. As such, OOS-affected individuals switch disproportionately more often to alternatives which are similar to the unavailable item, in contrast to dissimilar substitutes.

[2] Diels & Müller (2013), *Psychology & Marketing*, *30 (6)*, 501-511.

[3] Diels & Müller (2013), working paper.

Essay 4[4] points attention to a prevalent decision problem in online retailing, in that it analyzes choice patterns of OOS-affected customers who simultaneously receive a customized recommendation for a substitutional article. In the scope of a comprehensive online study resembling purchase decisions in two product categories frequently purchased online, we find that the separate influences of phantoms and recommendations in directing choice do not necessarily add up to a combined effect when both factors appear within the same choice scenario. Instead, we identify boundary conditions of the factors' interaction. Specifically, we demonstrate that the magnitude of the effects varies contingent on whether or not customers consider the attribute promoted by the recommendation and the phantom to be relevant in their purchase decision.

Essay 5[5] seeks to corroborate the contention found in experimental research that individuals' preference for organic products is primarily driven by health and environmental motives. To this end, PLS structural equation modeling is used to integrate comprehensive self-reported FMCG purchase data and corresponding survey data concerning households' demographics and attitudinal measures. The analysis reveals a positive relationship between customers' attitudes towards organic products and their relative preference for buying them. Yet, there is no support for a direct effect of health and environmental consciousness on relative green preferences. Rather, the influence of both measures is significantly and fully mediated by individuals' attitudes towards these items. Interestingly, this relationship is found to be weaker for personal care than for food products. In addition, the results refute an influence of demographic factors such as income, age of household leader and number of children on households' attitudes towards as well as preference for organic products. Based on these findings, valuable implications to foster organic sales are deducted.

Table 1.1 provides an overview of the five essays summarizing their key findings, the data studied as well as the applied statistical methods.

[4] Diels & Hildebrandt (2012), working paper.

[5] Diels (2013), working paper.

Table 1.1 Overview of Included Essays and Key Findings

	Key findings	Data	Applied statistical methods
Essay 1 Diels, Wiebach, & Hildebrandt (2013)	• Customers' substitution patterns in out-of-stock (OOS) situations are context-dependent. • Promotions are an essential driver of OOS-induced substitution patterns. • In OOS situations, preferences shift according to a reversed similarity effect, which is reduced for stock-outs of promoted items. • The strength of the reversed similarity effect is moderated by the similarity (dissimilarity) of promoted substitutes.	Survey data (hypothetical, within-subject)	*T*-test ANOVA
Essay 2 Diels & Müller (2013)	• In experimental study design, the nature of choice setting applied significantly moderates the efficacy of the choice set composition on individuals' preference formation. • The strength of context effects varies contingent on the post choice obligation (i.e., hypothetical versus binding decision environments). • The magnitude of the similarity effect significantly reduces under binding choice settings including real economic consequences for test persons.	Survey data (hypothetical vs. binding, between-subject)	χ^2-based contingency analysis Binary logistic regression *T*-test
Essay 3 Diels & Müller (2013)	• OOS-induced switching patterns systematically refute the assumptions of classic economic theory. • The reserved similarity effect persists in market-like choice scenarios inclusive of real brands and binding payment obligations.	Survey data (binding, within-subject)	χ^2-based contingency analysis
Essay 4 Diels & Hildebrandt (2012)	• Asymmetrically dominating phantoms significantly increase the choice probabilities of dominated target options. • The simultaneous occurrence of phantoms and recommendations yields an interactive effect on preferences for targeted choice options. • The sign and strength of the interaction is bounded by individually assigned attribute weights and product familiarity.	Survey data (hypothetical, between-subject)	Binary logistic regression
Essay 5 Diels (2013)	• Customers' relative preference for buying organic products is significantly driven by their general attitudes towards these types of goods. • Customers with strong concern for their health and for the environment also tend to have a positive attitude towards organically produced articles. • There is no direct effect of health and environmental consciousness on preferences for organic items. Instead the effect is fully mediated by individuals' attitudes towards these products.	Panel data	PLS structural equation modeling

1.3 Contribution

In summary, the reported findings of the doctoral dissertation at hand provide relevant insights into customers' preference formation processes against various backgrounds, hence significantly contributing to general decision-making and retailing literature.

1.3.1 Theoretical Contribution

Essay 1 successfully relates the assumptions of context and phantom theory to individuals' choice behavior when formerly preferred items no longer form part of a choice set. As such, the essay enhances the understanding of substitution decisions which result in response to OOS situations of preferred items by providing a theoretical framework to understand and predict OOS-induced shifts in relative preference ordering. Particularly, the results of two within-subject analyses corroborate the general contention that customers' choices are context-dependent (e.g., Huber et al., 1982; Simonson & Tversky, 1992; Tversky & Simonson, 1993) and systematically impacted by the relative position the unavailable item, i.e. the phantom, holds in the choice set. This can be considered an interesting finding since it underpins that, although only constituting illusory choice options, phantoms exhibit a systematic influence on the overall preference structure of a decision maker. Essay 1 further extends the knowledge on OOS-induced choice behavior by examining the relevance of promotions as substantial moderators affecting individuals' substitution decisions. Particularly, promotions are operationalized as price reductions, which lead to alterations in the composition and overall dominance structure of the choice set, thereby inducing shifts in preferences contrary to the assumptions of classic economic theory as well as formerly exhibited preference structures.

Essay 2 and **3** comply with the frequently emphasized need for additional research to replicate findings in more market-like scenarios which match the decision context of real purchase decisions (see e.g., Burton & Zinkhan, 1987; Simonson, 1989; Sinn, Milberg, Epstein, & Goodstein, 2007). On this account, essay 2 examines whether the size of the similarity effect (SE) – as one of the prevailing context effects (Tversky, 1972) – is significantly attenuated in market-like experimental designs, which include real payments for branded products opposed to purely hypothetical designs. Particularly, the analysis is based on the common notion in economic decision theory which states that the introduction of

binding choices inclusive of real payments can increase subjects' intrinsic motivation to engage in a cognitively effortful elaboration of information (Bettman, Johnson, & Payne, 1990), consequently leading to a reduced propensity to use simple choice heuristics, which are considered to promote context effects in general (Mao & Oppewal, 2012). We find strong support for our main hypothesis, thereby considerably challenging context effect research: In realistic shopping environments, the influence of the decision context, i.e. the influence of choice set composition on preference formation and choice, might be smaller than suggested by prevailing findings in the field. Hence, these findings' generalizability can be considered somewhat limited since the magnitude of context effects might be overstated when the studies' results are based on purely imaginative decisions from test persons.

Essay 3 combines and extends the findings of essays 1 and 2 by studying OOS-induced preference formation in realistic shopping environments inclusive of branded choice alternatives and payment obligations for test persons. Our findings underline the empirical contentions that customers' choices are context-dependent and that OOS-induced preference shifts systematically refute the assumptions of classic economic theory. As such, we prove the robustness of the reversed similarity effect (*RSE*), even under market-like shopping scenarios, by demonstrating that OOS-affected individuals predominantly switch to alternatives which are similar to the unavailable items, in contrast to dissimilar substitutes.

Essay 4 attends to the previously unaddressed issue of constructive preference formation in situations where phantoms and recommendations simultaneously occur within the same choice scenario. The reported findings add to the knowledge of how alterations in the choice set composition can significantly moderate the effects yielded by changes in the visual aspects of a choice set and vice versa (Fasolo, Misuraca, McClelland, & Cardaci, 2006). As such, we show that the factors' separate effects do not necessarily add up to a joint influence when appearing within the same choice scenario, but that boundary conditions of the interaction must be considered. Second, we further our understanding of constructive preference formation (Bettman et al., 1998; Payne, Bettman, & Schkade, 1999; Payne et al., 1992) by introducing relative attribute weights into the analysis of phantom and recommendation effects. In this context, and in line with other researchers in the field (e.g., Fitzsimons & Lehmann, 2004; Malaviya & Sivakumar, 1998), we are able to prove that alterations in the preference structure, which are induced by contextual factors, differ contingent on individually assigned attribute weights.

Essay 5 extends research on customers' preference drivers for organic over non-organics items by overcoming the delineated shortcoming of extant literature to be either purely qualitative or based on customers' reported purchase intentions only. Against this background, it is the first study to use real purchase data and according attitudinal and value related measures of the same panel population to corroborate the experimental contention that health and environmental concern are the primary drivers of green purchase decisions. The results of a comprehensive structural equation analysis refute the direct effect of health and environmental consciousness on organic preference structures. Instead the influence of both measures is fully mediated by individuals' attitude towards organically produced items.

1.3.2 Managerial Contribution

Since OOS incidents continue to be a prevalent phenomenon in stationary retailing (Gruen & Corsten, 2008) and the complete elimination of empty shelf spaces does not seem recommendable with respect to cost considerations (Aastrup & Kotzab, 2010), the need for practitioners to understand and actively encounter customers' responses in OOS situations is clearly underlined. As such, encouraging OOS-affected customers to not leave the outlet but instead choose a replacement item within the remaining assortment represents a major challenge for on- as well as offline retailers. In this regard, the research presented in **essays 1**, **3** and **4** enhances the understanding of OOS-induced switching behavior and its moderators, thus providing important implications for active OOS management.

Particularly, the findings of **essays 1** and **3** lay the foundation for marketers to understand how customers' choices evolve when formerly preferred items unexpectedly become unavailable due to OOS situations. Particularly, the studies reveal both theoretically as well as under market-like conditions that OOS-affected customers tend to primarily switch to substitutional items which resemble the first-choice option on the considered attribute dimensions. Marketers can use this information for their general assortment planning, as it seems favorable to always stock two similar products to facilitate substitution decisions in OOS situations. Also, the findings suggest that retailers who want to promote the sales of their own private labels can benefit if they carefully position their own products next to stocked-out items of national brands and emphasize the similarity of the respective products. This way, customers might come in first contact with the retailer's brand and even consider it in future purchases.

In addition, **essay 1** contains valuable insights about the prediction of customers' choices in sets inclusive of unavailable as well as promoted items. It is suggested that phantoms have a great deal in common with other marketing variables with regard to the effect on changing customers' preferences and systematically directing choice. While phantoms, albeit involuntarily, induce customers to switch brands, promotions can be applied to provide a further, yet positive, incentive to do so. Hence, by combining the effects of both variables, retailers are empowered to systematically guide demand to, e.g., their own private labels or slow selling articles of the assortment. In addition, promotions of substitutional articles can be deliberately applied to prevent customers from leaving the store after an OOS incident. In this regard, our results suggest that the effect of promotions can be enhanced when the same choice set likewise includes a phantom, i.e. an unavailable choice alternative. However, retailers should contemplate the overall choice set composition when wishing to influence substitution decisions through promotional activities, since different combinations of promoted and unavailable products can provoke distinct effects. Likewise **essay 4** reveals how marketers can cannily direct customers' preferences in reduced choice sets by changing the overall choice set presentation through recommendations, while simultaneously accounting for differences in the individually perceived importance of the included attribute dimensions. The results of both essays are especially relevant and applicable for online retailers who have greater flexibility with regard to the presentation of available and unavailable as well as promoted or recommended articles. Based on the fact that online retailers possess a lot of customer-specific information on preferences and choice, e.g. due to former purchases or entered search criteria, they can, hence, precisely customize the composition of the choice set contingent on the effects they wish to produce.

Essay 2 likewise provides important implications for practitioners, as it indicates that changes in market share induced by the introduction of new and similar products might be overstated in previous hypothetical research to some extent. Consequently, for manufacturers, the potential cannibalization effect of an introduction of a line extension on the sales volume of a parent brand may be less critical as formerly suggested. Yet, on the other hand, predictions about the potential to steal competitors' market share by introducing similar products (Burton & Zinkhan, 1987) should likewise be adjusted downwards, since sales could also be won at the expense of the company's own dissimilar products. Further, retailers can apply the attained results when assessing the success of introducing new private labels to

challenge the sales of similar incumbent national brands (Geyskens, Gielens, & Gijsbrechts, 2010).

Essay 5 provides valuable implications for marketers on how to promote the sales of organic articles by revealing crucial drivers of customers' decision-making vis-à-vis organic products. Particularly, the results of a comprehensive panel analysis suggest that retailers, who wish to foster organic sales, might not need to address customers' awareness for health or environmental issues, but should instead try to directly support the formation of positive attitudes towards organic items. This could be achieved, for instance, by training customers' awareness and overall knowledge on what defines organic articles, thereby carving out the relative benefits of organically produced goods and eventually leading to improved attitudes.

2 THE IMPACT OF PROMOTIONS ON CONSUMER CHOICES AND PREFERENCES IN OUT-OF-STOCK SITUATIONS (ESSAY 1)

Jana Luisa Diels, Nicole Wiebach, & Lutz Hildebrandt

Journal of Retailing and Consumer Services, Volume 20, Issue 6, pp. 587-598

3 REVISITING TVERSKY'S TRAIL – HOW MONEY MAKES A SUBTLE DIFFERENCE IN SIMILARITY EFFECT EXPERIMENTS (ESSAY 2)

Jana Luisa Diels & Holger Müller

Psychology & Marketing, 30 (6), pp. 501–511

4 REVERSING THE SIMILARITY EFFECT IN STOCK-OUTS – A NEW LOOK AT A RENOWNED PHENOMENON IN CONSUMERS' BRAND SWITCHING BEHAVIOR (ESSAY 3)

Jana Luisa Diels & Holger Müller

Working paper

Abstract

Over 40 years of research have established the robustness of the similarity effect (Tversky, 1972) as a behavioral pattern that constitutes that the introduction of new items into choice sets predominantly reduces the choice share of similar options. In this research, we examine whether the similarity effect systematically reverses when options are excluded from the considered choice sets as is the case in stock-outs. To this end, we study within-subjects decisions under certain out-of-stock conditions in an enhanced experimental design that resembles real shopping environments. Specifically, we observe unforced choices of experienced consumers inclusive of real payments for products in online transactions. Our results corroborate the existence of a reserved similarity effect even in the market-like choices. Specifically, we find that the OOS-induced switching patterns systematically refute the assumption of classic economic theory since consumers disproportionately more often switch to alternatives being similar to the unavailable item in contrast to dissimilar substitutes. Finally, we deduct fruitful directions for follow-up research in the general domain of context effect research.

4.1 Introduction

According to the classical theory of consumer demand, rational behavior and constant as well as immutable preferences govern most conduct in individuals' decisions making (McFadden, 1999). These assumptions form the cornerstone of a number of models on consumer behavior, implying that consumer choice is consistent and emerges independent of the context in which a decision is made (Simonson & Tversky, 1992). As such, the well-recognized principle of proportionality (Luce, 1959) suggests that new items being introduced into a choice set reduce the share of abundant choice options proportional to their share in the original choice set. Yet, these theoretical assumptions disregard empirical findings indicating that subjective preferences are a) subject to changes contingent on the composition of a considered choice set, and b) altered by shifts in the dominance structure of the included options (e.g., Huber, Payne, & Puto, 1982; Simonson & Tversky, 1992; Tversky, 1972). Specifically, it has been shown that by expanding choice sets with new choice options, substitution is more pronounced for alternatives similar to the newly introduced options than for dissimilar choice options, an idea being dubbed the similarity effect or similarity hypothesis by Amos Tversky in his seminal contribution on the elimination by aspects approach in consumer choice (1972).

In more than four decades, the similarity hypothesis as described above has been replicated in the scope of several empirical studies and against various backgrounds (see e.g., Burton & Zinkhan, 1987; Gierl & Stiegelmayr, 2011). However, the question of whether the similarity effect is systematically inverted when choice options are excluded from the considered choice set - hence, constituting a reversed similarity effect (*RSE*) - remains an understudied issue in the general research on context effects. By definition, the *RSE* stipulates that alternatives that are perceived similar to a first-choice option can disproportionally increase their share when the latter can no longer be selected or becomes unavailable in a subsequent second choice, respectively. The importance of further research on the *RSE* for both academics as well as practitioners is stressed by the omnipresence of its situational prerequisites in real transactions. As an example, in the case of e-commerce bookings, customers frequently encounter situations in which they are likewise prompted to reconsider their former choice after learning that the ordered option, while still being displayed on the screen, is currently unavailable for choice due to an out-of-stock (OOS) situation of limited items (e.g. flight tickets) or other situations of scarcity of goods.

Research on phantom alternatives (e.g., Hedgcock, Rao, & Chen, 2009; Pettibone & Wedell, 2007) provides general insights into the shifts in consumers' preferences when choice sets include unavailable options. A phantom alternative is considered an option that looks real but is unavailable at the time a decision is made (Pratkanis & Farquhar, 1992), and which then induces phantom effects in that it systematically shifts subjects' choice towards target options. Studies on phantom effects commonly apply between-group-designs, where choice shares are compared between individuals who choose out of experimentally varied sets (e.g. choose either from a two-option choice set consisting of a target and a competitor or from a three-option choice set that additionally includes the unavailable phantom). Due to this experimental setup, studies in the field say little about the occurrence of an *RSE* in terms of disproportional shifts in choice share of formerly available options. However, as correctly pointed out by Chatterjee, Roy, and Malshe (2011) in a recent paper on context effects in this journal, a stronger focus should be set on within-subjects-designs since only subsequent decisions of subjects allow for a profound analysis of the systematic shifts in individuals' choice that is induced by choice set alterations.

Hence, in order to effectively analyze whether consumers' switching patterns after encountering restrictions within the considered choice set constitute an *RSE*, a common two-stage approach has to be employed where individuals are to choose a) from a full choice set including all options in a first step, and b) subsequently from a reduced choice set where the formerly preferred option is no longer available. To the best of our knowledge, yet there is only one published study applying such a within-subjects-approach in an examination of similarity effects. Specifically, Wiebach and Hildebrandt (2012) investigate individual switching behavior in situations of assortment reduction in a hypothetical study. Their findings corroborate the existence of an *RSE* in that they show that the permanent elimination of options from a retailer's assortment significantly promotes the choice of similarly perceived options.

While this initial study provides useful insights into the manner in which customers' choice evolves when preferred items subsequently become unavailable, the generalizability of the results must be considered limited due to the usage of simplified choice settings (e.g. exclusion of real brands and no choice-options). Further, and even more critical, the study's findings are based on stated purchase intentions rather than real choices. However, the importance of considering economic consequences for subjects is stressed by recent findings in consumer research indicating that specific behavioral patterns (i.e. the compromise effect)

is prone to overestimations when based on mere hypothetical decisions (Müller, Kroll, & Vogt, 2012b).

Thus, the current follow-up study fills this research gap in that it examines the robustness of the *RSE* within-subjects using experimental environments that come as close as possible to real shopping situations in a specific distribution channel, namely online transactions. Hence, we deliberately followed the general paradigm of measuring preferences in an experimental task environment that resembles the task environment that the decision makers will actually face in reality - an idea termed "context matching" in the decisive contribution of Payne, Bettman, and Schkade (1999). Accordingly, we applied a market-like setting by a) including real brand names (Sinn, Milberg, Epstein, & Goodstein, 2007), b) sampling only test persons who are experienced buyers of the tested product categories (Laroche, Kim, & Zhou, 1996), and c) allowing for a choice deferral, i.e. including the option to reject a choice (Dhar, 1997a). In addition, and most pertaining to the requested realism and the overall objective of our study, we provided subjects with real economic consequences in terms of buying obligations inclusive of real payments for products. To this end, experimental choice decisions are made binding in that test persons are requested to pay for receiving the products they selected in the course of the experimental study.

4.2 A Theoretical Framework of the (Reversed) Similarity Effect

Most traditional formulations of customers' decision making view utility maximization as a synonym for choice (McFadden, 1999). Likewise, rational decision makers are believed to assign a utility to each considered choice option and always strive to select the alternative with the highest ascribed value. One implication of these assumptions is that relative preferences between alternatives are stable and emerge regardless of the absence or presence of other choice options (Tversky & Simonson, 1993). Particularly, Luce's framework of the independence of irrelevant alternatives (IIA) (1959) indicates that the relative choice probability of two options, T and C, in a set A, which is in turn a subset of B, must not be different from their respective relative choice probability in the set B. In marketing terms, this implies that the introduction of a new brand into a market reduces the choice share of abundant choice options in proportion to their original share (Huber & Puto, 1983), hence leaving the original relative shares unaffected.

$$P\{T;C \mid A\} = P\{T;C \mid B\} \quad (4.1)$$

However, this idea disregards the specific characteristics of the newly introduced item relative to the characteristics of the established options of the original choice set. Consider a choice set consisting of two options T and C which are described along two attributes, e.g. price and quality (see Figure 4.1.1). T and C are non-dominating in that T is expensive and of high quality, whereas C represents a low price-quality alternative.

Figure 4.1 Framework of the Similarity Effect and the Reversed Similarity Effect

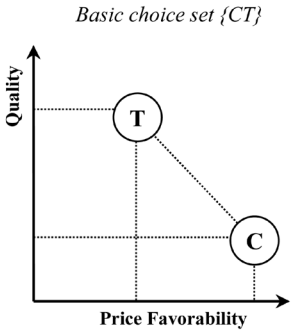


Figure 4.1.1
Core Set

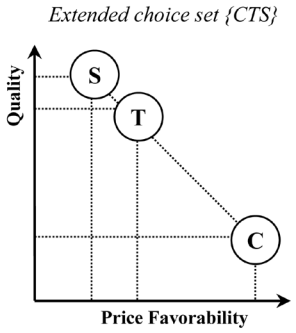


Figure 4.1.2
SE

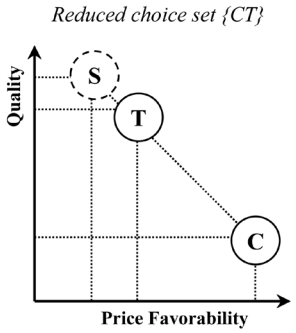


Figure 4.1.3
RSE

If now a third option S, like option T being of high price and premium quality, is introduced into the choice set (see Figure 4.1.2), T and S are categorized as a dense subregion of similar alternatives (Cohen & Basu, 1987; Krumhansl, 1978), hence constituting substitutional choice options (Tversky, 1972). Concurrently, the dissimilarity of C is accentuated as it now represents a lone alternative (Kahn, Moore, & Glazer, 1987) in the triplet choice set. Consequently, the newly introduced option S gains choice share at the only expense of T (Brenner, Rottenstreich, & Sood, 1999; Huber & Puto, 1983), while the choice probability of the clearly dissimilar option C remains mainly unaffected. It evidently follows that the IIA assumption is refuted under these circumstances since the relative choice share of T in the triplet choice set is reduced relative to the binary choice set without S. This idea has been termed the similarity effect (*SE*) by Tversky (1972) stating that "the addition of an alternative to an offered choice set hurts the alternatives that are similar to the added alternative more than those that are dissimilar to it" (Tversky, 1972, p. 283).

$$P\{T;C \mid T,C\} > P\{T;C \mid T,C,S\} \quad (4.2)$$

Accordingly, if we consider the reversed setting where one option is excluded from the choice set and can no longer be selected, e.g. due to a stock-out, the resulting shifts in relative choice share can be conjectured to also deviate from proportionality. Specifically, we suppose that for cases where S is unavailable, the most similar option T can attract a disproportionately larger part of the released choice share than the respective dissimilar alternative C (see Figure 4.1.3), resulting in a so-called reversed similarity effect (*RSE*) as introduced by Wiebach & Hildebrandt (2012). That is, in a sequential within-subjects choice setting where subjects have to choose once from the full set $\{T,C,S\}$ and again from the reduced choice set $\{T,C\}$, the relative choice share of the options T and C in the full set can be assumed to constitute a benchmark $P_B\{T;C \mid T,C,S\}$. Based on this benchmark, shifts in relative choice proportions which result from changes in the composition of the choice set can be assessed with regard to their compliance with the proportionality framework (i.e. the IIA assumption). In scenarios where S becomes an unavailable choice option in the second choice, this proportionality framework suggests that the relative choice share of T and C among subjects who formerly chose S but needed to switch due to the unavailability $P_S\{T;C \mid T,C\}$ should largely comply with the benchmark ratio. Given that the IIA holds, it should result that $P_B\{T;C \mid T,C,S\} = P_S\{T;C \mid T,C\}$.

However, if those 'switchers' predominantly opt for the similar alternative T after S's exclusion in the reduced set, $P_S\{T;C \mid T,C\}$ exceeds $P_B\{T;C \mid T,C,S\}$, hence corroborating the context-dependence of choice and constituting the *RSE*. Formally, the size of the *RSE* can be written as:

$$RSE = P_B\{T;C \mid T,C,S\} - P_S\{T;C \mid T,C\} \quad (4.3)$$

To investigate the occurrence of the *RSE* in market-like environments, the current research studies within-subject choices in two different scenarios: Firstly, we consider implicit OOS situations where all subjects are to choose twice from varying choice sets (once in the full choice set and again in the reduced sets exclusive of option S). This allows for unambiguously disentangling systematic shifts in subjects choice in the form of an *RSE* from

simple errors in repeated decisions. Secondly, we narrow our focus to a full realistic OOS situation in that only those participants who formerly chose S, which is then explicitly announced to be unavailable, are asked to select a substitutional product within the remaining alternatives.

4.3 Study I

4.3.1 Sample, Stimuli, and Experimental Design

We recruited a subsample of one-hundred and thirty-one respondents from a professional online survey pool of a large German University. By including qualifier questions in the recruitment emails we required a minimum level of category-specific buying experience among respondents. We offered selected participants a chance to win a €15 Amazon voucher in a post-survey drawing as was the common reward for participation in this pool.

As for the setting of the stimuli, we included real brands from the following three categories: jam, ketchup, and toothpaste. Note that we conducted a comprehensive pretest among a different subsample of the online pool (n=108) to a) ensure that prices (P) and brand associated quality perceptions (Q) were considered the key drivers of shopping decisions in those categories, and b) identify brands that were in line with the indented price-quality perceptions in the experimental product space (see also Figure 4.2). Accordingly, we included in each category two similarly perceived medium price/quality brands (S, T) as well as a dissimilar low price/quality brand (C). The particular positions of the brands in the experimental product space were derived from slightly discounted market price levels and modified quality ratings ranging from 0 (lowest quality value possible) to 100 (highest quality value possible). As for the latter, we transformed school grades that were given in consumer reports of two common German test institutions (TEST, ÖKO-Test). For instance, as depicted in Appendix 4.1, the experimental choice sets in the category toothpaste contained the brand Dentagard (Q: 70, P: €0.39) as option C, Blend-a-med (Q: 95, P: €0.89) as option T, and Colgate as the respective similar option S with the highest price/quality (Q: 100, P: €0.99).

In line with the main objective of this study, we manipulated the experimental factor ‘choice set size’ (full choice sets [triplets] vs. reduced choice sets [pairs]) within subjects. Thus, subjects first were offered the triplets including all three options $\{T, C, S\}$ in each category. Subsequently, in the choices on reduced sets, subjects were asked to consider and

make a decision on the paired choice sets $\{T, C\}$ in which the most expensive option with the highest quality (S) was excluded (see Figure 4.2.1). Hence, each subject had to indicate a total of six relevant choices.

Figure 4.2 Positions of Options in the Experimental Product Space

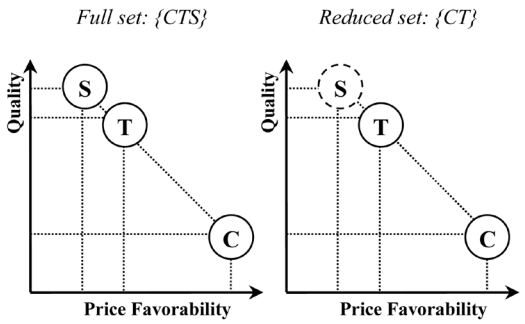


Figure 4.2.1
Study I

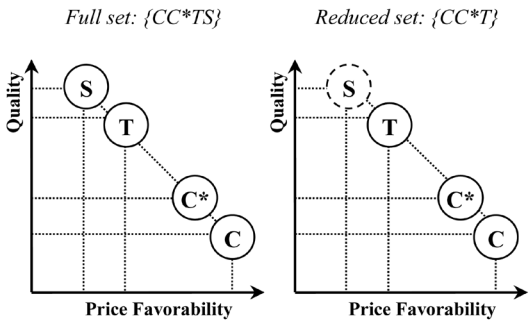


Figure 4.2.2
Study II

4.3.2 Procedure

The online survey was conducted over a one-week period in April 2012. At the start, participants were informed in a briefing section about the binding properties of their decisions. Specifically, we applied a common random-payoff mechanism (RPM) known from the fields of experimental economics (Grether & Plott, 1979) in that we randomly determined one choice of the participants which would then become binding. More precisely, the survey was designed such that if a test person has selected an item in that particular decision, a real purchase transaction was executed, in that the test persons received the chosen item in exchange for an immediate online payment of the respective selling price. Yet, if the purchase was deferred in the particular drawn decision, no further transaction took place. By applying this mechanism the independence of subjects' decisions was ensured, since every single choice could become pay-off relevant (Starmer & Sugden, 1991). Note that the actual survey started only when the participants provided informed consent about the binding properties of their decisions by explicitly checking a control box. Hence, we ensured that subjects were fully aware of the economic consequences in terms of making real payments for receiving selected products when executing the experimental choice tasks.

Next to the briefing section, subjects had to give personal characteristics (i.e., demographical information such as age, gender etc.) and information related to their patterns of consumption (e.g., brand relevance, brand awareness, shopping frequencies). Then, subjects were presented with the purchase decisions on the triplets $\{T, C, S\}$ in each category followed by the decisions on the paired sets $\{T, C\}$. In each choice, subjects were asked to indicate which brand, if any, they would like to buy. Thereby, no-choice options were deliberately included in each purchase decision. The choice tasks were worded on the top of the respective PC screens as follows: "You can buy an item from the category X right now. Please take a look at the following set of options in the category X. Which one, if any, do you want to buy?". As for the presentation of the stimuli, the online software depicted a common alternative-by-attribute matrix format that was vertically centered on the screen, and that resembled virtual shelves commonly used in online-shops. Thus, colored images of the test brands were represented in columns, whereas the rows contained from top to bottom the brand names, the quality ratings, and the selling prices. Below the prices, check boxes were displayed for indicating the subjects' choices.

4.3.3 Results

According to our results, we find strong support for the efficacy of an *RSE* when option S, that is similar to option T, is made unavailable for choice on the paired sets $\{T, C\}$ after it had formerly been selectable in the triplet $\{T, C, S\}$. For instance, as depicted in Appendix 4.2, we find that 21 subjects are not interested in buying any option in the jam triplets, hence yielding an initial overall purchase rate of 84% in the unreduced choice set. Further, 33 subjects opt for the option C, 32 choose T, while 45 select the option S. Of the latter, 17 subjects refuse to buy any of the offered options when their former choice (S) is made unavailable in the paired set, hence indicating a 37.8% (17/45) loss due to the stock-out. However, of the 28 subjects who switch to one of the remaining brands under the paired set, the large majority of 23 participants choose the similar option T, and only 5 participants switch to the dissimilar option C. Thus, as depicted in Appendix 4.3 a disproportional shift in subjects' switching behavior becomes obvious: while the choice share of T relative to C is 49.2% under the triplet, the former option wins 82.1% of the 28 brand switchers. This constitutes a substantial *RSE* sized 32.9% which is significant according to a Chi²-test of contingency (χ^2=8.77, p<.01).

The same significant disproportional pattern in subjects' brand switching behavior applies to the other categories: On average, we come up with a 42.0% magnitude of the *RSE*. In addition, it is noteworthy that we find subjects whose formerly preferred triplet option was still available in the subsequently presented paired set to be remarkably consistent. Specifically, as can be seen in Appendix 4.2, in the jam category 93.9% of the buyers of C (31 out of 33) replicate their former triplet choice in the paired sets. Likewise, we come up with a high 93.8 (95.2) percentage of choice consistency among T-buyers (non-buyers). As these resulting high purchase rates apply to the other categories under test, we conclude that the observed significant *RSE* is, in fact, a systematic shift rather than induced either merely by chance, errors in subjects' choice, or the like.

4.4 Study II

4.4.1 Sample, Experimental Design, and Procedure

In Study II, we recruited a different subsample of one-hundred and twenty respondents from the same online survey pool. We used an experimental procedure identical to Study I in the form of unforced within-subjects decisions of experienced consumers between real brands in a binding context across the categories jam, ketchup, and toothpaste.

However, we deliberately applied two substantial variations in the choice setting. First, as can be seen in Appendix 4.1 as well as Figure 4.2.2, we added a second low price/quality option C* in the choice sets to control for potential pooling effects in the first choice of subjects that might favor the general occurrence as well as the magnitude of the *RSE*. Specifically, consumers occasionally tend to exhibit a choice aversion against "lone alternatives of a choice set" as is the case for option C in the triplet $\{T, C, S\}$ (Kahn et al., 1987). In terms of the established distance-density-principle (Krumhansl, 1978), this avoidance tendency is based on the idea that relative to the lone option C, the alternatives T and S constitute a dense subset of options that is perceived homogenous, draws more attention to it, hence making a choice from this subset more appealing than choosing the separate option C (Pechtl, 2009). As a consequence, we offered a quadruplet $\{T, C, C^*, S\}$, rather than a triplet $\{T, C, S\}$ to all subjects in the initial choice.

Second, we incrementally increased the degree of realism in the choice setting compared to Study I by explicitly including a verbal as well as a pictorial reference to a stock-out only for particular subjects. Specifically, after initially selecting from the quadruplets $\{T, C, C^*, S\}$, subjects whose first choice was option S learned that their former choice was unavailable due to a stock-out. This was realized by crossing out the brand image in red inclusive of a diagonally positioned label "unfortunately out-of-stock" in the virtual shelves on the PC screen after the option S had been selected via checking the respective box. Hence, we induced a subsequent second choice only for S-buyers in the categories, and tested their switching behavior for the occurrence of a systematic *RSE*.

4.4.2 Results

The results of Study II likewise evidence the occurrence of the *RSE* throughout all product categories. As an example, we find that in purchase decisions for jams, 35 subjects opt for the alternative S in the unreduced choice set, whereas 22 (8, 19) buy the alternative T (C*, C) and 36 subjects decide not to purchase at all (see Appendix 4.2). Lending support to our hypothesis, 57% (20/35) of those who formerly bought S and were eventually informed about its unavailability switch to the most similar brand T in the subsequent choice. By contrast, only 26% (9/35) of the OOS-affected individuals select one of the dissimilar brands, i.e. C or C*, and 17% (6/35) refuse to purchase at all. Put differently, we observe a relative choice share of T in comparison to C and C* of 44.9% in the unreduced choice set compared to a corresponding relative share of T of 69.0% for those individuals who switch after the unavailability of S. Hence, the data evidences a strong *RSE* which augments to 24.1% and is significant according to a Chi²-test of contingency (χ^2=4.25, p=.05, see Appendix 4.3).

The same pattern can be observed in the two other categories, i.e. toothpaste and ketchup, resulting in an average *RSE* of 33.1%. Hence, the data corroborates our contention that by excluding one choice alternative from an offered set, e.g. due to a stock-out, the most similar alternatives predominantly benefit since these options can attract a disproportionate part of individuals' choice share which is released due to the unavailability of their formerly preferred choice option.

4.5 General Discussion

Our study extends the research on customers' preference formation in restricted choice sets by proving the robustness of the reversed similarity effect (*RSE*) in within-subject choices in market-like shopping scenarios. Specifically, the results of two comprehensive online studies inclusive of real payments support the contention found in hypothetical research that by excluding formerly available choice options from offered choice sets, the choice probability of similar substitutes augments more than would be predicted by the assumption of classic economic theory. Particularly, we observe both in implicit as well as explicit OOS scenarios that when formerly preferred options become unavailable, OOS-affected individuals show the tendency to disproportionately more often switch to alternatives being similar to the unavailable item in contrast to dissimilar substitutes.

Our research provides straight avenues for future research. Firstly, while our results indicate a robust reversed similarity effect even in repeated real choices, we do not forward behavioral explanations on why this pattern emerges. A promising direction for follow-up research would hence be to account for the psychological processes underlying substitution decisions in restricted choice sets. As such, follow-up research could assess if, for instance, individuals switch to similar items in an attempt to simplify decision processes and minimize the risk of substitution (Breugelmans, Campo, & Gijsbrechts, 2006) or whether general loss-aversion (Kahneman & Tversky, 1979; Pettibone & Wedell, 2000) and shifts in attribute weight (Parducci, 1965) govern this behavior.

Second, research on the true psychological underpinnings of the *RSE* using real choices might be fruitful for academic research on context effects in general. Specifically, an intuitively appealing argument is that in studies under market-like shopping conditions, subjects' involvement with the decision at hand is increased - which in turn has been proven to enhance cognitively effortful elaboration of information and dilute the use of simplifying choice heuristics (Müller, Vogt, & Kroll, 2012a). Therefore, questions arise as to what extend subjects' involvement with the decision moderates the efficacy of subsequent choice set restrictions (e.g. induced by items' stock-out) on the occurrence and the magnitude of the *RSE*.

Third, future studies are encouraged to study the specific influence of individual and situational factors on the strength of the *RSE*. Research in the domain of general OOS reactions has demonstrated that e.g. general shopping attitude or time pressure affect how

customer react to the unavailability of a desired item (e.g., Campo, Gijsbrechts, & Nisol, 2000; Sloot, Verhoef, & Franses, 2005). These factors could, in turn, also have an impact on OOS-induced substitution decision, as customers with a less favorable attitude towards shopping and those being under time pressure can be expected to show a larger tendency to simplify substitution decisions in OOS situations by selecting to most similar substitutes. Such behavior would then be manifested substitution patterns in even greater accordance with an *RSE*.

Appendices

Appendix 4.1 Experimental Stimuli Positions in Studies I and II (based on pre-test, n=108)

					Position in experimental product space		
	Price/ quality index[a]	Brand name	Brand awareness[b]	Option	Market segment	Quality position[c]	Price position[d]
Jam	0.54	Schwartau	97%	S	Medium	97	1.49 €
		Zentis	76%	T	Medium	91	1.29 €
		StarMarke	40%	C*	Low	68	0.99 €
		Rewe	50%	C	Low	61	0.89 €
Toothpaste	0.57	Colgate	97%	S	Medium	100	0.99 €
		Blend-a-med	99%	T	Medium	95	0.89 €
		Signal	86%	C*	Low	75	0.49 €
		Dentagard	84%	C	Low	70	0.39 €
Ketchup	0.72	Heinz	100%	S	Medium	80	1.59 €
		Kraft	78%	T	Medium	75	1.29 €
		G&G	76%	C*	Low	60	0.69 €
		JA!	74%	C	Low	57	0.59 €

[a] based on pre-test (n=108) expressed as ratio of the mean importance of product prices and qualities for purchase decisions in the category based on individual judgments of subjects on a constant sum scale (100 points)
[b] based on pre-test (n=108) expressed as the percentage of subjects who purchased the brand before
[c] quality points from 0 (worst) to 100 (best) based on consumer reports (TEST; ÖKO-Test), occasionally slightly modified for manipulation purposes
[d] based on slightly discounted market prices

Appendix 4.2 Purchases, Purchase Rate (PR in %), OOS Lost Rate (in %) and Repurchase Rate (RPR in %)

		Jam			Toothpaste			Ketchup		
	Option	**{STC}**	**Δ{T,C}**	**RPR{TC}**	**{STC}**	**Δ{T,C}**	**RPR{TC}**	**{STC}**	**Δ{T,C}**	**RPR {TC}**
Study I n=131	PR	84.0	70.2		89.3	85.5		71.0	45.0	
	OOS loss		37.8			21.7			59.3	
	S	45	-	-	23	-	-	54	-	-
	T	32	23	93.8	47	16	97.9	9	17	88.9
	C	33	5	93.9	47	2	93.6	30	5	90.0
	no buy	21	17	95.2	14	5	92.9	38	32	94.6
	Option	**{STC*C}**	**Δ{TC*C}**		**{STC*C}**	**Δ{TC*C}**		**{STC*C}**	**Δ{TC*C}**	
Study II n=120	PR	70.0			88.3			81.7		
	OOS loss		17.1			7.4			44.3	
	S	35	-		27	-		61	-	
	T	22	20		36	21		6	18	
	C*	8	3		14	2		15	8	
	C	19	6		29	2		16	8	
	no buy	36	6		14	2		22	27	

Appendix 4.3 Relative Choice Shares (in %) and RSE Values (in %)

		Study I						Study II				
Category	Brands	$P_B\{T;C\}$	$P_S\{T;C\}$	RSE	Chi²	p	Brands	$P_B\{T;C\}$	$P_S\{T;C\}$	RSE	Chi²	P
Jam	T	49.2	82.1	32.9	8.77	0.01	T	44.9	69.0	24.1	4.25	0.05
	C	50.8	17.9				C*C	55.1	31.0			
Toothpaste	T	50.0	88.9	38.9	9.28	0.01	T	45.6	84.0	38.4	11.32	0.001
	C	50.0	11.1				C*C	54.4	16.0			
Ketchup	T	23.1	77.3	54.2	16.89	0.001	T	16.2	47.1	36.7	10.68	0.01
	C	76.9	22.7				C*C	83.8	52.9			
	Mean			42.0			Mean			33.1		

5 THE ROLE OF ATTRIBUTE IMPORTANCE IN MEDIATING THE INTERACTIVE EFFECT OF PHANTOMS AND RECOMMENDATIONS ON PREFERENCE FORMATION (ESSAY 4)

Jana Luisa Diels and Lutz Hildebrandt

Working Paper

Abstract

This conceptual paper analyzes the previously unaddressed issue of constructive preference formation in choice sets including both unavailable as well as recommended choice options. In a preliminary study, we find that the separate influences of phantoms and recommendations in directing choice do not necessarily add up to a combined effect when both factors appear within the same choice scenario. Instead, we identify boundary conditions of the factors' interaction. Specifically, we demonstrate that the magnitude of the effects varies contingent on whether or not customers consider the attribute promoted by the recommendation and the phantom to be relevant in their purchase decision. The research has two important contributions: From a theoretical standpoint, it is the first to integrate findings on phantoms and recommendations by simultaneously accounting for customer specific differences in perceived attribute weights. From a strategic perspective, it shows how demand can be directed by strategically placing recommendations and unavailable options according to customers' predilections.

5.1 Introduction

Imagine you are navigating through the internet intending to buy a new MP3 player. On a particular website you find two different players: one high-price option with a large amount of memory space and one cheaper player with less storage capacity. The website also displays a third MP3 player which is the same price as the first option, yet with even more memory space. However, this attractive option is tagged as being unavailable. How would this information change your preference for the available options? And, which option would you choose if the retailer simultaneously gave you a recommendation for one of the available players? Would your decision be different depending on whether price or memory space was more important to you? The research at hand seeks to provide first empirical insights to answer these questions.

Prior research has documented that individuals' preferences are constructive rather that immutable and vary contingent on the decision environment and the characteristics of the respective decision task (Bettman, Luce, & Payne, 1998; Murray & Häubl, 2005; Payne, Bettman, & Johnson, 1992). Two variables that have been acknowledged to significantly impact preferences and ultimately choice are (1) the decision context, i.e. the specific set of alternatives being considered (Simonson & Tversky, 1992) and (2) product recommendations (Häubl & Murray, 2003). With regard to the context-dependence of choice, the literature suggests that preferences result as a function of the composition and the dominance structure of a given choice set (Bhargava, Kim, & Srivastava, 2000; Huber, Payne & Puto, 1982; Simonson, 1989). Consequently, alterations in preferences can be observed when new alternatives are introduced into a choice set, even if these alternatives only constitute *phantoms*, which look real but are unavailable at the time the decision is made (Farquhar & Pratkanis, 1993). Although impossible to select, phantoms elicit an influence on the relative choice proportions of the available choice options. In this regard, the most robust effect is the so-called *phantom effect* (Pechtl, 2011), which stipulates that the appearance of an asymmetrically dominating but unavailable choice alternative can attract choice share to the respective dominated option. This is because the phantom's presence increases the weight individuals assign to the phantom's strong attribute, hence supporting the choice of similar and available choice alternatives (e.g., Hedgcock, Rao, & Chen, 2009; Pettibone & Wedell, 2007).

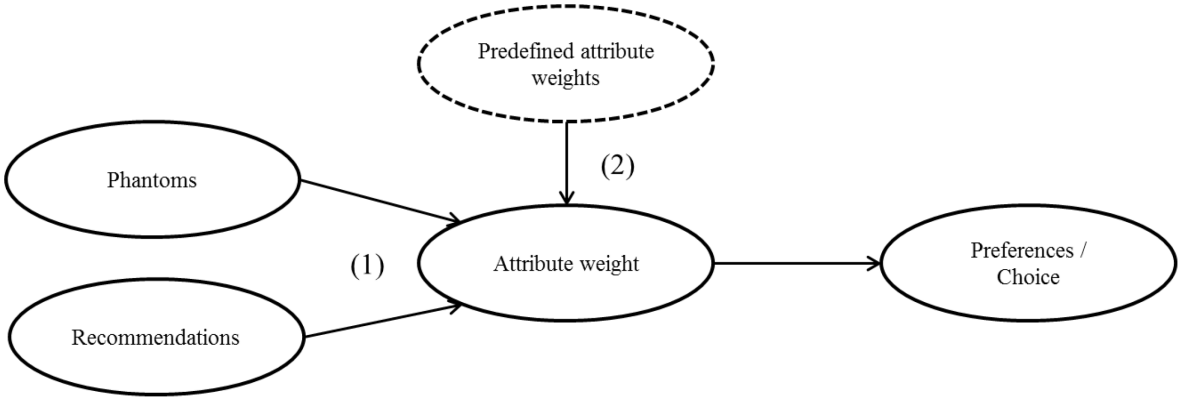
Likewise, empirical studies – mostly conducted in online choice scenarios – provide strong evidence that product recommendations significantly influence customers' preferences and ultimately their choice (e.g., Häubl & Murray, 2003; Kramer, 2007; Senecal & Nantel, 2004). Especially relevant to the research at hand is that recommendations have the potential to significantly impact the relative weight assigned to the included attributes (e.g., Kivetz & Simonson, 2000). In this regard, Häubl and Murray (2003) assert that including an attribute within a recommendation enhances the attribute's overall importance and its relevance in the final purchase decision. Also, it can be conjectured that recommendations yield a perceptual focus effect (Hamilton, Hong, & Chernev, 2007), in that by tagging choice options with special recommendation symbols or by altering their prominence through distinct visual features, certain product attributes gain decision relevance in the ultimate choice (Bettman & Sujan, 1987; Gardner, 1983; Jiang & Punj, 2010; Lurie & Mason, 2007; Mandel & Johnson, 2002; Tversky, Sattath, & Slovic, 1998).

Further, individuals are known to differ with regard to the relative weight they assign to distinct attribute dimensions for purchases of different products. These individually assigned attribute weights can be considered the starting point of preference formation in the moment of choice (Malaviya & Sivakumar, 1998), which determine if, and how phantoms and recommendations alter the preference relationship between the offered choice options. Thus, if we are to understand the effects of recommendations and phantoms on preference formation, we should not disregard the moderating influence of predefined attribute weights. This is especially relevant since the internet – as a very interactive and dynamic medium – offers ample opportunities for retailers and marketers to personalize product offers and adapt the general presentation of information to consumers' predilections (Bellman, Johnson, Lohse, & Mandel, 2006; Simonson, 2005). Since a lot of websites save information about former or current customers or directly ask clients about their preferences during the purchase (Kramer, 2007), online retailers can deduct a lot of valuable inferences about attribute specific preferences. These inferences, in turn, can be used to exert control over the shopping environment and impact preference formation and decision making more specifically.

Summing up, it follows that both unavailable choice alternatives, i.e. phantoms, as well as product recommendations have the ability to influence predefined attribute weights, thereby altering a decision maker's preference structure and ultimately guiding choice. However, so far empirical decision making research has not considered cases in which both factors occur simultaneously within the same choice scenario. Although, it can be easily imagined that

retailers give customized recommendations for available products when other, maybe formerly preferred options, are unavailable.

Figure 5.1 Conceptual Framework



The current study represents – to the best of our knowledge – the first approach to address this gap by (1) analyzing how phantoms and recommendations interact and by (2) further taking into account predefined perceived attribute weights to propose boundary conditions of the interactive effect (see Figure 5.1).

As such, the research can be understood as a conceptual paper to provide first empirical insights, recognize limitations and provide alternate explanations in order to stimulate follow-up research. To this end, the authors first replicate the phantom effect by showing that asymmetrically dominating but unavailable choice alternatives significantly increase the choice probabilities of dominated target options. Further, we establish the significant influence of recommendations on guiding final choice decisions. We then demonstrate that the simultaneous occurrence of phantoms and recommendations can increase the positive effect on targeted choice alternatives for some product categories. Finally, we provide boundary conditions by revealing that the proposed effects are moderated by the importance customers assign to the included features prior to the exposure to recommendations and/or phantoms and by customers' general expertise with the decision task.

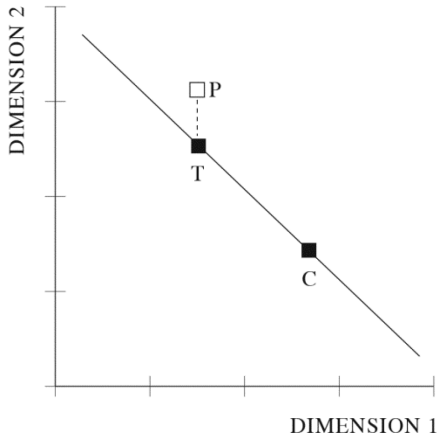
5.2 Conceptual Framework

5.2.1 Effects of Phantoms and Recommendations on Preference Formation

According to classic economic theory, relative preferences between two alternatives merely depend on the characteristics of the respective alternatives and cannot be altered by other options which are introduced or removed from a choice set (Luce, 1959). Yet, Farquhar and Pratkanis (1993) demonstrate that under some circumstances, the inclusion of a third alternative which is, however, unavailable and hence not selectable, can substantially increase the choice probability of one alternative of the original choice set. Such unavailable alternatives are termed *phantoms* as they represent choice options which look real but for some reason are unavailable at the time a decision is made (Pratkanis & Farquhar, 1992).

Although phantoms are impossible to select, they still exert an influence on the preference ordering of the available options of a choice set, since the phantom's characteristics are compared against the available alternatives to come to a purchase decision (Scarpi, 2008). Consequently, the phantom does not proportionally increase the choice probability of the available items, but systemically promotes the choice of certain options contingent on its relative position in the choice set.

Figure 5.2 Core Choice Set Including a Phantom



More precisely, it has been shown that the introduction of an asymmetrically dominating phantom (P) into a binary choice set consisting of a target option (T) and a competitor (C) (see Figure 5.2) can lead to a significantly enhanced choice probability of the respective dominated alternative, i.e. T (e.g. Hedgcock et al., 2009; Highhouse, 1996; Pettibone &

Wedell, 2000, 2007), resulting in the so-called phantom effect (Pechtl, 2011). This effect pertains to the group of local context effects (Huber et al., 1982; Simonson, 1989; Tversky 1972) which indicate that preferences are context-dependent and change subject to the composition of the particular choice set under consideration, i.e. the available options and their respective characteristics (Simonson & Tversky, 1992). Just like context effects, phantom effects violate the assumptions of classic economic theory, namely regularity and the independence of irrelevant alternatives (IIA), since choice shares shift disproportionally and increase despite the introduction of new (yet unavailable) options.

One explanation to account for the enhanced preference of T in a three-optional choice set is that the phantom produces shifts in the perceived importance of the attribute dimensions under consideration. More precisely, due to the inclusion of P, T's best dimension gains decision relevance which favors its preference over C. Reasons for this are manifold: Firstly, it can be argued that the unavailability of P signals scarcity of dimension 2 on which both P and T dominate C. As the perceived scarcity increases the attractiveness of this dimension, T is preferred over C (Pratkanis & Farquhar, 1992). Secondly, Pettibone and Wedell (2007) forward that due to the inclusion of P, the range of different choice options on dimension 2 is increased. This way, its respective weight is enhanced and the likelihood of selecting T is augmented. Furthermore, Hedgcock et al. (2009) show that the addition of P increases the number of options which perform well on dimension 2 again directing preferences towards T (see Figure 5.2).

Yet, decision research suggests that preferences are not a function of the composition of the choice set alone, but also seem to be highly contingent on the characteristics and framing of the choice problem (Bettman et al., 1998; Bettman & Sujan, 1987; Murray & Häubl, 2005; Slovic, 1995). Here, one factor which is extremely crucial in today's retailing environment is the use of recommendations to help customers handle the existent information overload and support satisfactory decision making with reduced cognitive effort (Häubl & Trifts, 2000). Empirical studies identify that recommendations work as a decision orientation and systematically influence customers' preferences and choices (e.g., Dellaert & Häubl, 2012; Häubl & Murray, 2003; Senecal & Nantel, 2004). Particularly, studies conducted in the online context document that recommendations can alter the relative weight assigned to the attributes included in the respective recommendation. In this regard, Kivetz and Simonson (2000) show that attributes which are common between displayed alternatives, and which are thus conveniently comparable, are given more importance in the final choice decision than unique

dimensions which are only available for some options but not for others. In a similar vein, Häuble and Murray (2003) provide evidence that the incorporation of an attribute within a recommendation increases the attribute's importance in choice tasks with negative inter-attribute correlation. As an explanation for their findings, the authors forward that customers are prone to primarily process information which is readily available (*principle of concreteness*; Slovic, 1995) and which is temporarily more salient wherefore the included attributes are given an enhanced weight. Moreover, they assert that recommendations are interpreted as an indication of the attributes which the online retailer and other, possibly knowledgeable, customers deem to be of high relevance for evaluating the respective product.

Additionally, it has been argued that perceptual characteristics of a choice set can alter individually assigned attribute weights, which finally impact preferences and choice (Bettman & Sujan, 1987; Gardner, 1983; Janiszewski, 1998). In this regard, the *prominence hypothesis* (Tversky, Sattath, & Slovic, 1998) states that visually salient attributes are given more weight in choice process since they serve as easily identifiable decision criteria, which can be processed with less effort than, e.g., abstract characteristics of choice alternatives (Bettman & Sujan, 1987). Thus, perceptually focal attributes gain decision relevance and are weighted more heavily when making choices (Jiang & Punj, 2010). Drawing on these findings, it can be conjectured that tagging recommended options by special recommendation symbols or highlighting them through attention-grabbing colors and animations will also yield a perceptual focus effect (Hamilton et al., 2007), in that the recommended option and its strong attributes become more prominent and increase their relative importance in the overall decision process.

Summing up, empirical evidence suggests that taken separately both (1) changes in the composition of the choice set through unavailable choice options and (2) changes in the decision properties through recommendations can impact perceived attribute weights, the overall preference structure and ultimately choice. Since, however, the interactive effect of both factors still remains an unanswered issue in decision making research, the first part of this study aims to answer the questions of whether or not recommendations and phantoms exert a mutual effect on preferences and choice and, further, how pronounced this joint effect is relative to the discrete effects of both variables.

5.2.2 Effects of Phantoms and Recommendations Contingent on Relative Attribute Weights

The importance being assigned to different product attributes is known to vary contingent on the decision maker and the respective product to be purchased. These variations, in turn, are deemed to influence applied decision strategies and ultimately affect how changes in the decision context impact customers' preference ranking. This is because the ascribed attribute weights moderate how individuals perceive the dominance structure of a choice set, thereby determining how changes in this structure influence preference formation and finally choice (Malaviya & Sivakumar, 1998). Drawing on these findings, we suppose that the strength of the phantom effect will also vary depending on whether P dominates T on an important or unimportant attribute for the respective decision maker.

Figure 5.3 Choice Sets Including Phantoms and Recommendations

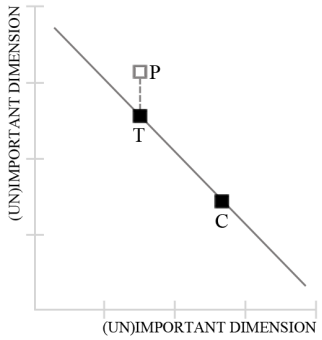


Figure 5.3.1
Choice Set with Phantom

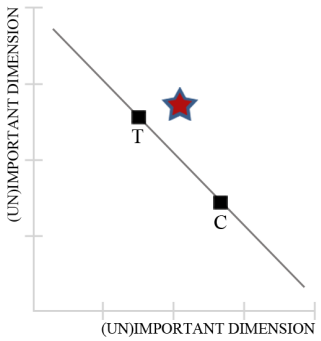


Figure 5.3.2
Choice Set with Recommendation

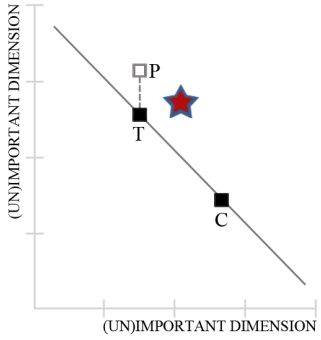


Figure 5.3.3
Choice Set with Phantom and Recommendation

More precisely, we propose that displaying a phantom which excels on an attribute that is of high relevance for the decision maker will disproportionally increase the choice share of the alternative which is dominated by the phantom on that specific attribute, i.e. T (see Figure 5.3.1). This is because the phantom signals scarcity of the already important attribute dimension, leading to an *informational cascade effect* (Ge, Messinger, & Li, 2009), in that the desirability of the similar, available option is increased and the decision maker experiences a sense of urgency to select T which remains the only alternative still performing well on the decision relevant attribute. However, for decision makers with only small valuation for the

phantom's strong attribute, its presence will highlight the inferiority of T on the already irrelevant attribute, making T even less desirable. Therefore, in this case the phantom effect should be diminished.

Accordingly, we expect the influence of recommendations to also depend on the relative weight customers assign to the included attributes and the respective strong attribute of the recommended product. If, for instance, customers receive a recommendation for a product performing very well on an attribute which they consider to be of little or no relevance for their purchase decision, they can be expected to react less to it than when the recommendation supports an alternative which is strong on a decision relevant feature (see Figure 5.3.2). Furthermore, they could even become reactant to the recommendation as it evidently contradicts their perceived dominance structure in a binary choice set where C clearly outperforms T on the attribute being relevant to them (Fitzsimons & Lehmann, 2004). This, in turn, could be manifested in an even more reduced choice proportion of the recommended alternative in comparison to the case where there is no recommendation at all.

Ultimately, cases need to be considered where both the recommendation and the phantom favor the choice of T (see Figure 5.3.3). Here, we conjecture that the combined effect of recommendations and phantoms will be elevated for people with positive valuation for T's strong dimension. This is because the phantom again signals scarcity of the decision relevant attribute, making T more desirable. This enhanced desirability might then be even more increased by the recommendation which represents another justifying reason to select T. For customers, however, who do not consider the accentuated dimension relevant, the effect will be smaller.

5.2.3 Effects of Phantoms and Recommendations Contingent on Expertise

Prior research has documented that the degree of experience with a decision task is negatively correlated with individuals' tendency to construct preferences at the time of decision making (e.g., Bettman et al., 1998). This is because, adept decision makers, so-called experts, can resort to former experiences made with a respective choice task wherefore their preferences are better-developed and less prone to be altered by changes in the decision environment. However, for novices, i.e. customers with little specific category knowledge, alterations in the decision context or additional informational cues which are made prominent can play a major role in the construction of preferences and ultimately choice (e.g., Kramer, 2007; Mandel & Johnson, 2002). Based on the notion that phantoms and recommendations

also lead to changes in the decision environment, it can hence be argued that their influence will also be moderated by the level of experience of the respective decision maker. Particularly, we assume that the effect of recommendations and phantoms as well as their joint influence will be more pronounced for novices, as they can be expected to align their preferences with external decision aids and changes in the decision context.

5.3 Method

5.3.1 Stimuli and Sample

A total of 451 individuals participated in the online survey, of which 423 (405) answers were usable for the analysis in the MP3 player (hotel) category. MP3 players and hotel stays were used as test stimuli in this research. A pretest (n=35) revealed that price and memory space (distance to city center) were considered the main drivers of purchase decisions in these categories. Hence, the fictitious choice alternatives T, C and P were described along these dimensions. In line with most context-effect studies, binary choice sets with negative inter-attribute correlation were construed, where T and C formed the non-dominating core choice set and P constituted an asymmetrically dominating but unavailable choice alternative (e.g., Doyle, O'Connor, Reynolds, & Bottomley, 1999; Pettibone & Wedell, 2007; see Figure 5.2).

Table 5.1 Stimulus Description

	MP3 player				Hotel		
Attribute	T	C	P	Attribute	T	C	P
Price	84€	68€	84€	Price	94€	82€	94€
Memory	6GB	4GB	8GB	Distance to city center	20min	28min	15min

More specifically, in our study C always outperformed T on the price dimension, whereas T exceled with regard to memory space (distance to city center). Additionally, in test conditions including a phantom, P was displayed which was of the same price as T but with more memory space (less distance to the city center). Table 5.1 describes the attributes of T, C and P for both products. In experimental conditions including a recommendation, a star saying "Retailer's Recommendation" tagged the target alternative T. Additionally, at the bottom of the page it was explained that the recommendation resulted from individually stated preferences with regard to MP3 player purchases or hotel bookings and matched the measured

preferences most closely. In test scenarios containing a phantom, all three alternatives T, C and P were displayed. However, the unavailable option P was pixilated and tagged by a sign saying “unavailable”. Depending on the respective experimental condition, test persons saw the recommendation symbol, the phantom or both (see Appendix 5.1 - Appendix 5.4).

5.3.2 Experimental Design and Procedure

The experiment followed a 2 (*phantom* yes vs. no) x 2 (*recommendation* yes vs. no) between-group design (see Figure 5.4). For each participant, the survey consisted of two online shopping tasks (one for MP3 players and one for hotel stays). In the first shopping task, subjects were randomly assigned to one of four experimental conditions[6] for one of the two included products: The control group (CG) was presented with the core choice set, including the alternatives T and C but no recommendation or phantom (see Figure 5.4.1). Experimental group 1 (EXP1) additionally saw product P which was tagged to be unavailable and could, thus, not be selected (see Figure 5.4.2). Like the control group, EXP1 did not receive any recommendation. Experimental group 2 (EXP2), in turn, did not see any phantom but only received a recommendation for the target T (see Figure 5.4.3). Finally, experimental group 3 (EXP3) was exposed to a choice set consisting of T, C and P with T being highlighted by a recommendation symbol (see Figure 5.4.4). Analogously, in the second shopping task, participants were again randomly assigned to the experimental conditions and confronted with a choice decision for the accordant remaining good.

Figure 5.4 Experimental Choice Sets Including Phantoms and Recommendations

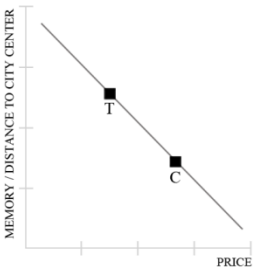


Figure 5.4.1
CG

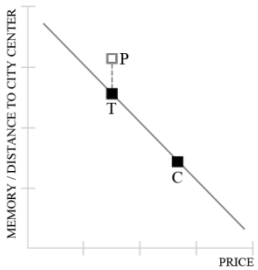


Figure 5.4.2
EXP1

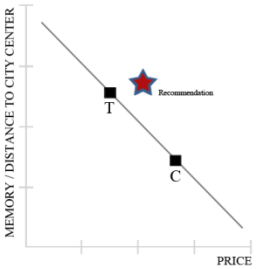


Figure 5.4.3
EXP2

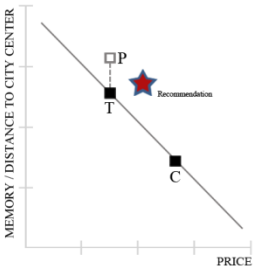


Figure 5.4.4
EXP3

[6] Please note, that CG-EXP3 formed part of a larger online study on internet lifestyles and consumers’ reaction behavior in online out-of-stock situations.

Irrespective of the experimental group, the study commenced with warm-up questions about participants' overall internet skills and their general intention to shop online. Following this, test persons had to rank six different attributes with regard to their individually perceived importance in purchase situations of MP3 players or hotel stays respectively. The ranking comprised of the attributes *price*, *memory space*, *battery life*, *color*, *design* and *supported data format* for MP3 player purchases and *price*, *distance to city center*, *room size*, *hotel category* and *overall hotel size* for bookings of hotel rooms. The ranking was followed by the first shopping scenario where participants were exposed to the core choice set with or without phantom and/or recommendation (depending on the respective experimental group) and had to make a choice between the options T and C. After a new array of filler questions, participants were asked to undertake a second ranking, this time for purchases of the according second product. Next, they were directed to the second shopping task, which essentially resembled the first one, and had to choose between the options T and C. The survey closed with an elicitation of demographical information such as gender, age, household size and income.

5.3.3 Classification of Subjects into Attribute Importance Levels

The individually assigned ranks in the attribute ranking tasks were employed to split the group in the second half of the analysis. Subjects placing *memory space* (*distance to city center*) at ranks 1-3 were assigned to the *attribute relevant* condition whereas subjects placing the dimension at ranks 4-6 were classified into the *attribute irrelevant* condition. Please note that by having test persons rank six attributes, out of which only two served for the later analysis, we intended to reduce a possible testing bias (Campbell & Stanley, 1963), since we expected subjects to not remember the specific assigned ranks in the later shopping task, so that they would make their choice independent on the formerly performed ranking. Also, filler questions between the ranking and the ultimate choice decision were applied to preclude a possible bias.

5.4 Results

5.4.1 Overall Effects of Phantoms and Recommendations

Consistent with previous research on context effects, we analyzed the general potential of phantoms and recommendations to induce systematic shifts in choice probabilities by comparing the relative choice share of the core set choice options T and C between the control group and the experimental conditions. However, standard approaches applied to assess the magnitude of context effects usually assume equally distributed choice shares of T and C in the baseline scenario, i.e. in the control group without any treatment (e.g., Simonson & Tversky, 1992). Yet, as can be deducted from Table 5.2, in our study the baseline choice shares of the CG were not identical for the alternatives T and C in either of the product categories. Hence, in order to be able to calculate a phantom effect (*PE*), a recommendation effect (*RE*) and a joint effect of both factors (*PRE*), we followed an approach suggested by Malaviya and Sivakumar (1998) to compute relative effect sizes despite the unbalanced initial baseline shares.

Table 5.2 Relative Choice Share and Relative PE, RE and PRE (in %)

	MP3 player (n=423)					Hotel (n=405)			
	CG (n=106)	EXP1 (n=105)	EXP2 (n=108)	EXP3 (n=104)		CG (n=121)	EXP1 (n=91)	EXP2 (n=102)	EXP3 (n=91)
T	42.5	47.6	46.3	61.5	T	13.2	30.8	34.3	34.1
C	57.5	52.4	53.7	38.5	C	86.8	69.2	65.7	65.9
PE/ RE/ PRE[a]	-	8.9	6.6	33.0	*PE/ RE/ PRE*[a]	-	20.3	24.3	24.1

[a] *PE* = phantom effect, *RE* = recommendation effect, *PRE* = joint effect of phantom and recommendation

Particularly, we took into account the distribution of choice shares in the baseline scenarios to evaluate the maximum number of points the target could possibly attract in the experimental conditions with phantoms and/or recommendations. That is, we related the absolute changes in T's choice proportion to the initial choice share of C in the baseline scenario. For example, consider the shifts in choice share between the CG and EXP3: Speaking in absolute terms, the magnitude of change is approximately the same in both categories, i.e. 19% for MP3 players and 20.9% for hotels. However, these numbers disregard that the maximum choice share T could have possibly attracted in the hotel case was 86.8%, in contrast to only 57.5% for MP3 players. Hence, a 20% increase in choice share for player T

needs to be weighted more than an equivalent change in the hotel category. In order to account for this, we calculated relative effect sizes as the ratio of the absolute difference in the choice share of T and the initial share of C in the control group (e.g., PRE_{MP3}=19.0/57.5 and PRE_{Hotel}=20.9/86.8) (c.f., Malaviya & Sivakumar, 1998).

Table 5.2 summarizes the relative effect sizes for both products across all experimental conditions. The data supports our contention that the appearance of an asymmetrically dominating phantom can yield a positive relative *PE* in both test categories (PE_{MP3}=8.9, PE_{Hotel}=20.3). In line with our hypothesis, the results further establish that the incorporation of a recommendation for T can increase its relative choice share, leading to a positive *RE* regardless of the considered product (RE_{MP3}=6.6, RE_{Hotel}=24.3). Yet, we only find mixed evidence concerning the proposed interactive effect of phantoms and recommendations: In the case of MP3 players, we demonstrate that the mutual appearance of the factors can yield a positive *PRE* which is larger than the sum of the factors' discrete effects (PRE_{MP3}=33.0). However, choice shifts in the hotel category exhibit a different pattern where the magnitude of change induced mutually by the phantom and the recommendation is not more than the effect the factors produce individually (PRE_{Hotel}=24.1).

In order to establish the significance of the descriptive findings, we performed a binary logistic regression in which the factors product (coded as "0" for MP3 players vs. "1" for hotels), phantom (coded as "0" if there was no phantom vs. "1" if there was a phantom) and recommendation (coded as "0" if there was no recommendation vs. "1" if there was a recommendation) were regressed on subjects' choice of the available products T and C (coded as "1" if subjects chose player/hotel T vs. "0" if they chose player/hotel C). Also, we included control measures (i.e., tendency to shop online, average daily time online and gender) to assess the robustness of the model. Overall the regression model can be written as:

$$\text{Log}\,[P(T)/P(C)] = \beta_0 + \beta_1\ \text{product} + \beta_2\ \text{phantom} + \beta_3\ \text{recommendation} + \beta_4\ \text{phantom} \times \text{recommendation} + \beta_5\ \text{tendency online shopping} + \beta_6\ \text{avg. time online} + \beta_7\ \text{gender} + \varepsilon$$

The results, summarized in Table 5.3, support the obtained descriptive findings. First, there is a significant main effect of product (*Wald*=39.509, *df*=1, p=0.00), suggesting that the relative preference of T over C varies across product categories. Also, we find a significant main effect of phantom (*Wald*=.216, *df*=1, p<0.01), lending support to the hypothesis that

phantoms positively affect the choice proportion of the dominated choice alternative T. Moreover, the results corroborate a significant main effect of recommendations (*Wald*=6.718, *df*=1, *p*=0.01) to guide choice decisions. Additionally, we find a significant main effect of gender (*Wald*=-.447, *df*=1, *p*<0.01) which is, however, of little theoretical interest. Other control variables do not reach significance (all *p*'s>0.1).

Table 5.3 Analysis on Aggregated Choice Data - Logistic Regression Results

	Variables	B	SE	Wald	df	Sig.	Exp(B)
Model components[a]	Constant	-.365	.325	1.259	1	.373	.746
	Product	-.950	.151	39.509	1	.000	.387
	Phantom	.581	.216	7.257	1	.007	1.788
	Recommendation	.551	.213	6.718	1	.010	1.736
	Phantom*Recommendation	-.210	.300	.490	1	.484	.811
	Tendency online shopping	.066	.276	.057	1	.812	1.068
	Avg. time online	.072	.151	.227	1	.634	1.075
	Gender	-.447	.153	8.475	1	.004	.640

a Goodness of Fit: Nagelkerke's R^2: 0.114; correct classifications: 65,2%

As can be deducted from Table 5.3, the phantom × recommendation interaction proves to be insignificant (*Wald*=.490, *df*=1, *p*>0.1). This result most probably stems from the different interaction pattern of phantoms and recommendations for MP3 players and hotels respectively: While for the former the descriptive analysis demonstrates a positive interactive effect of the factors on T's choice share, for the later we do not observe any interaction at all. Due to this inconsistency and contrary to other researchers in the field (Malaviya & Sivakumar, 1998; Mao & Oppewal, 2012), we refrain from an aggregated analysis of the choice data of MP3 players and hotels in the further course of the analysis but conduct separate tests for both products. As such, Table 5.4 summarizes the results of the first step of the disaggregated regression analysis for both products without interaction.

Table 5.4 Analysis on Disaggregated Choice Data - Logistic Regression Without Interaction

	Variables	B	SE	Wald	df	Sig.	Exp(B)
MP3 player: Model components[a]	Constant	-.408	.171	5.669	1	.017	.665
	Phantom	.413	.196	4.432	1	.035	1.512
	Recommendation	.358	.196	3.318	1	.069	1.430
Hotel: Model components[b]	Constant	-1.554	.204	58.010	1	.000	.211
	Phantom	.463	.227	4.148	1	.042	1.589
	Recommendation	.673	.229	8.660	1	.003	1.959

[a] Goodness of Fit: Nagelkerke's R^2: 0.024; correct classifications: 55,1%

[b] Goodness of Fit: Nagelkerke's R^2: 0.047; correct classifications: 72,8%

Lending support to our hypotheses, the existence of an asymmetrically dominating phantom proves to have a significant positive effect on the choice probability of the targeted choice alternative T in both product categories ($Wald_{MP3}$=4.43, df_{MP3}=1, p_{MP3}<0.05; $Wald_{Hotel}$=4.15, df_{Hotel}=1, p_{Hotel}<0.05). Further, the findings confirm the theoretical prediction that recommendations have the potential to significantly guide choice, irrespective of the considered product ($Wald_{MP3}$=3.32, df_{MP3}=*1*, p_{MP3}<0.1; $Wald_{Hotel}$=8.66, $df_{Hotel=}$1, p_{Hotel}<0.01).

The incorporation of an interaction term of both factors in the scope of an extension of the conditional model (see Table 5.5) supports the contention that by including both recommendations and phantoms within the same choice setting, the positive effect on the choice proportion of T can be augmented. Yet, this finding holds true only for MP3 players ($Wald_{MP3}$=7.99, df_{MP3}=1, p_{MP3}<0.01). In the case of hotels, however, the data indicates a negative interaction of phantoms and recommendations on the relative choice probability of T ($Wald_{Hotel}$=5.41, df_{Hotel}=1, p_{Hotel}<0.05), hence rejecting our experimental hypothesis for this type of good[7].

Table 5.5 Analysis on Disaggregated Choice Data - Logistic Regression with Interaction

	Variables	B	SE	Wald	df	Sig.	Exp(B)
MP3 player:	Constant	-.182	.112	2.629	1	.105	.833
Model components[a]	Phantom*Recommendation	.652	.231	7.988	1	.005	1.920
	Constant	-1.881	.268	49.144	1	.000	.152
Hotel:	Phantom	1.070	.352	9.270	1	.002	2.917
Model components[b]	Recommendation	1.232	.340	13.140	1	.000	3.428
	Phantom*Recommendation	-1.081	.465	5.414	1	.020	.339

[a] Goodness of Fit: Nagelkerke's R^2: 0.026; correct classifications: 56,3%

[b] Goodness of Fit: Nagelkerke's R^2: 0.066; correct classifications: 72,8%

5.4.2 Effects of Phantoms and Recommendations Contingent on Relative Attribute Weights

The moderating effect of individually perceived attribute importance on the magnitude of the *PE*, *RE* and *PRE* is presented in Table 5.6. Owing to the fact that again the baseline choice shares were unequally distributed between the options T and C in most of the experimental groups, all effect sizes were computed as the ratio of the absolute changes in T's choice

[7] Please note that, just as in the aggregated model, we included the control measures *tendency to shop online*, *average daily time online* and *gender* in the disaggregated regression models. These measures had no effect on the results of the documented models.

proportion divided by the maximum potential to gain choice share, i.e. C's choice share in the CG (Malaviya & Sivakumar, 1998). This way, a comparison of the magnitudes of the relative effects is feasible between the different conditions.

Consistent with our proposed hypothesis, the results reveal that the phantom is unable to attract choice share when it is placed on an attribute dimension irrelevant to the decision maker. Quite on the contrary, we find that in these cases the choice share is actually reduced in comparisons to choice sets containing only the core choice options, resulting in a negative *PE* in both categories ($PE_{MP3,unimp}$=-10.0, $PE_{Hotel,unimp}$=-10.1). Yet, for decision makers with high estimation for the respective attribute dimension, the appearance of an attractive but unavailable choice option can lure choice share to the dominated choice option T wherefore here the *PE* persists and is even enforced ($PE_{MP3,imp}$=12.4, $PE_{Hotel,imp}$=28.3). Additionally, the data corroborates our proposition that decision makers react more favorably to a recommendation if this is placed on a product exceling on an attribute relevant to them. Consequently, for these people the results yield an accentuated *RE* which exceeds the respective effect for decision makers with low esteem for the strong attributes of the recommended choice option ($RE_{MP3,imp}$=15.4, $RE_{MP3,unimp}$=-40.0, $RE_{Hotel,imp}$=29.8, $RE_{Hotel,unimp}$=15.5).

Table 5.6 Relative Choice Share, Relative PE, RE and PRE (in %) Contingent on Attribute Importance

MP3 player	Attribute unimportant (n=80)					Attribute important (n=343)			
	CG	EXP1	EXP2	EXP3		CG	EXP1	EXP2	EXP3
T	50.0	45.0	30.0	68.2	T	40.9	48.2	50.0	59.8
C	50.0	55.0	70.0	31.8	C	59.1	51.8	50.0	40.2
PE/ RE/ PRE[a]	-	-10.0	-40.0	36.4	*PE/ RE/ PRE*[a]	-	12.4	15.4	32.0
Hotel	Attribute unimportant (n=143)					Attribute important (n=262)			
	CG	EXP1	EXP2	EXP3		CG	EXP1	EXP2	EXP3
T	21.1	13.0	33.3	40.0	T	11.8	36.8	38.1	32.4
C	78.9	87.0	66.7	60.0	C	88.2	63.2	61.9	67.6
PE/ RE/ PRE[a]	-	-10.1	15.5	24.0	*PE/ RE/ PRE*[a]	-	28.3	29.8	23.4

[a] *PE* = phantom effect, *RE* = recommendation effect, *PRE* = joint effect of phantom and recommendation

In line with our hypothesis, the results further evidence that the joint occurrence of phantoms and recommendations within the same choice set can produce an additional positive effect on the choice proportion of the target T. However, this finding is restricted to decision makers with low valuation for the target's strong dimension ($PRE_{MP3,unimp}$=36.4, $PRE_{Hotel,unimp}$=24.0). For those, however, who assign high values to the respective feature, the

mutual effect of phantoms and recommendation is only slightly larger or even smaller than the sum of the discrete effects of both factors ($PRE_{MP3,imp}$=32.0, $PRE_{Hotel,unimp}$=23.4), hence rejecting our proposition that for those decision makers the interactive effect should be especially pronounced.

5.4.3 Effects of Phantoms and Recommendations Contingent on Expertise

In our experimental study, participants had to indicate if they possessed an MP3 player and whether or not they had stayed in a hotel. As for the latter, all test persons stated that they were familiar with hotel stays wherefore we could not split the group into novices and experts for hotel purchases. For MP3 players, however, 78 individuals stated that they did not own an MP3 player and were therefore assigned to the novice condition in the course of the further analysis. The remaining 345 participants were classified as experts.

The choice share data and the calculated effect sizes, summarized in Table 5.7, are consistent with our experimental contention. Firstly, the data supports that novices react more to the appearance of attractive but unavailable choice options, since the *PE* is almost doubled when a phantom is displayed in choice scenarios for customers with no experience with the respective choice task ($PE_{MP3,Exp}$=7.2, $PE_{MP3,Nov}$=18.2).

Table 5.7 Relative Choice Share, Relative PE, RE and PRE (in %) for Novices and Experts

MP3 player	Novice (n=78)					Expert (n=345)			
	CG	EXP1	EXP2	EXP3		CG	EXP1	EXP2	EXP3
T	38.9	50.0	45.0	69.2	T	43.2	47.3	46.6	59.0
C	61.1	50.0	55.0	30.8	C	56.8	52.7	53.4	41.0
PE/ RE/ PRE[a]	-	18.2	10.0	49.6	*PE/ RE/ PRE*[a]	-	7.2	6.0	27.8

[a] *PE* = phantom effect, *RE* = recommendation effect, *PRE* = joint effect of phantom and recommendation

Also, the impact of recommendations is accentuated, which is reflected in the slightly increased *RE* of novice customers ($RE_{MP3,Exp}$=6.0, $RE_{MP3,Nov}$=10.0). What is especially noteworthy is the diverging magnitude of the *PRE* for novices and experts: While the results yield a *PRE* of 27.8% for people who are familiar with MP3 player purchases, this effect is almost doubled with respect to novices where the relative increase in T's share rises to 49.6%.

5.5 General Discussion

The research we report in this conceptual study investigates scenarios in which phantoms and recommendations influence preferences and choice by changing the dominance structure as well as the perceptual focus of a given choice set. We base our analysis on the theoretical account that both factors have the potential to systematically induce alterations in the relative weight assigned to the attribute dimensions under consideration, thereby impacting the process of preference formation in the moment of choice.

Particularly, and contrary to normative predictions, we find that adding asymmetrically dominating phantoms can significantly increase choice proportions of respective dominated alternatives, hence resulting in the so-called phantom effect previously observed by other researchers (e.g., Hedgcock et al., 2009). Further, our data gives support for the acknowledged contention that making one option of the choice set perceptually focal by highlighting it with a recommendation can produce a significant positive effect on its choice share. Moreover, when phantoms and recommendations are applied within the same choice setting, they yield a significant interaction effect on the choice probability of the targeted choice option. Yet, the sign of this interaction varies between purchases for MP3 players versus hotel rooms. While for the former, the options' choice shares disproportionately increase when they are dominated by an unavailable product and simultaneously recommended, for hotels the interaction is negative indicating that the concurrent appearance of both factors leads to a diminishment in choice proportion of the respective alternative. These oppositional results may be attributed to diverging selling techniques applied by online retailers for electronic devices and hotel stays respectively. Since hotel bookings are always bound to a certain date, coevally recommending a product which is obviously dominated by a more attractive offer might be interpreted as an attempt by the online retailer to exploit remaining room allotments for the specific time period, thereby making customers suspicious of the ulterior motive to recommending the dominated alternative. Yet, since MP3 player purchases are not time-dependent, customers might react less skeptically, deliberately following the retailer's recommendation. However, this explanation is speculative and bears a validation in the scope of our analysis. Hence, further research is warranted to investigate underlying choice mechanisms to understand why phantoms and recommendations operate differently for varying products and situations.

Additionally, our research provides boundary conditions of the above findings by accounting for customer specific differences in assigned attribute weights. As such, we find that the potential of phantoms to direct choice to dominated alternatives is limited to individuals with high valuation for the phantom's strong dimension. A reason for this might be that the unavailability of the attractive offer is interpreted as a signal of scarcity of the decision relevant dimension, hence inducing a feeling of urgency to select similar, available options. For individuals, however, with low esteem for the respective dimension, the phantom's presence might actually underline the inferiority of the dominated alternative on the already irrelevant attribute, thus providing an additional reason to select respective competitors. In the same vein, we find that the relative effect of recommendations in guiding choice also depends on whether the strong feature of the recommended product matches or contradicts the respective decision relevant attribute of a customer. Particularly, it shows that recommendations are more effectual for choice options performing well on important attribute dimensions than for alternatives whose strong features are irrelevant to the decision maker. Surprisingly, in choice situations including both unavailable and recommended choice options, the potential to alter preferences is most pronounced for customers with low valuation for the attribute being promoted by the phantom as well as the recommendation. In contrast, the combined influence of phantoms and recommendations is only slightly larger or even smaller than the sum of the separate effects for those who attach high importance to the respective dimension. This suggests that the potential to increase relative attribute weight is somehow limited, in that although the attribute is highlighted by an increased number of factors, its assigned importance stagnates for those with an already high appraisal of it and can only be augmented for decision makers who did not consider the attribute relevant in the first place. Yet again, more research is warranted to sustain these contentions.

5.5.1 Theoretical Implications

Although only representing an initial conceptual step, the reported findings make some important theoretical contributions to the literature on context-dependent decision making (e.g., Häubl & Murray, 2003; Huber et al., 1982). First, we add to our knowledge of how alterations in the choice set composition can significantly moderate the effects yield by changes in the visual aspects of a choice set and vice versa (Fasolo, Misuraca, McClelland, & Cardaci, 2006). As such, we show that the factors' separate effects do not necessarily add up to a joint influence when appearing within the same choice scenario, but that boundary

conditions of the interaction must be considered. Second, we further our understanding of constructive preference formation (Bettman et al., 1998) by introducing relative attribute weights into the analysis of phantom and recommendation effects. In this context and in line with other researchers in the field (e.g., Fitzsimons & Lehmann, 2004; Malaviya & Sivakumar, 1998), we are able to prove that alterations in the preference structure, which are induced by contextual factors, differ contingent on individually assigned attribute weights.

5.5.2 Managerial Implications

The research presented in this article also provides practical implications from a marketing strategy perspective, since it demonstrates how marketers can influence consumers' choice by merely changing the presentation of a considered choice set. This becomes especially important in dynamic shopping environments, like the internet, where retailers have relative freedom in presenting their products and are also capable of customizing the shopping environment for each customer. Since online retailers possess a vast amount of customer specific information on preferences and shopping habits, they are able to cannily direct demand to certain products by strategically placing recommendations and unavailable options according to customers' predilections.

5.5.3 Limitations and Future Research

The primary purpose of the research at hand is to initiate the analysis of a so far understudied research topic, thereby seeking to stimulate follow-up research in this domain. To this end, the study makes no claim of completeness, but acknowledges experimental shortcomings and possible extensions which offer ample opportunities for further research.

Firstly, we propose that our hypothesis should be tested on more, maybe even different, product categories to establish the validity of the attained results. Our principal consideration guiding the selection of test categories was to find products which are frequently purchased on the internet and could easily be described along two key attributes. Although both preconditions were met by the selected products, in the case of hotels we might have abstracted away from categories which are frequently purchased by our test population. This might explain why the cheaper hotel accounted for almost the entire choice share (87%) in the baseline scenario. The skewedness of our data led to imbalanced choice shares and very small cell sizes in some cases, wherefore we were not able to perform advanced statistical tests.

Consequently, our results remain descriptive throughout some sections of the paper. By executing more deliberate pretests, products should be found that are frequently purchased by the deployed test population and that can be described along attributes which are preferred by approximately the same share of the interviewed individuals.

The rather small adjusted R^2s obtained in the binary logistic regression represent another shortcoming of our study. However, these diminutive values can be attributed to the fact that we only included two independent variables and their interaction into the analysis. We did that intentionally in order to prove the significant influence of phantoms and recommendations on choice decisions irrespective of other influencing variables, thereby laying the basis for upcoming research in this domain. Yet, the small goodness of fit attained suggests that other factors determine choice in purchase decisions with phantoms and/or recommendations. These factors should be uncovered and integrated in the model to enhance the statistical fit.

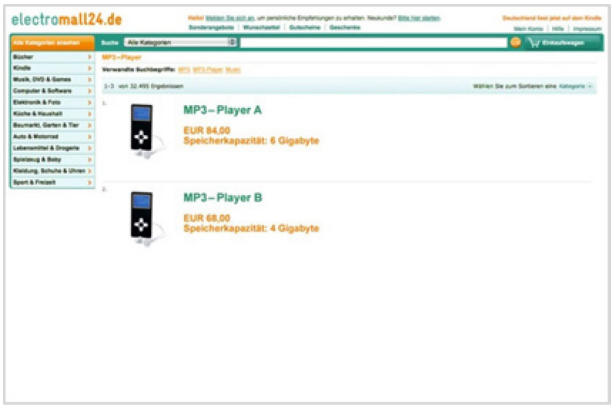
Finally, upcoming research should explicitly pinpoint the specific mechanism underlying decision making in choice sets with unavailable as well recommended choice options. Particularly, it should seek to understand if the observed shifts in choice proportion can really be attributed to alterations in the relative weight assigned to the considered attributes, or which other processes could possibly guide decision making under these circumstances. To this end, oral protocols or scales to explicitly measure attribute weights before and after the treatment and between the experimental conditions could be applied.

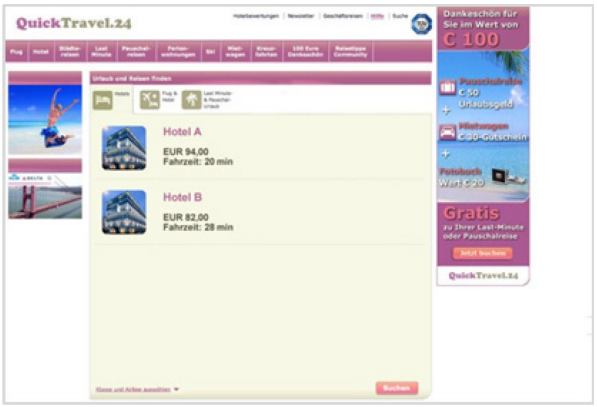
Despite the shortcomings of the experimental study at hand, the attained results nevertheless challenge context effect research since they indicate that the magnitude of context effects might depend on relatively assigned attribute weights of the considered choice options. Hence, future studies are encouraged to re-test the prevailing context effects accounting for differences in attribute importance. Likewise, follow-up research could vary the positions of the recommended as well as the respective unavailable product to evaluate alterations in the effect size if, for instance, the competitor is highlighted by a recommendation while a phantom asymmetrically dominates the target. Do the individual effects level out under these circumstances? And, do the sign and the magnitude of the interaction again depend on the individually assigned attribute importance? Lastly, our findings underline the need to conduct further research to understand the interplay of different context variables in inducing alterations in preference structures and choice decisions. This becomes increasingly important since a growing proportion of consumers' purchase decisions

are nowadays made online where marketers and online retailers have ample opportunities to combine visual and sensual effects like music, animations and background colors with different choice set compositions to impact customers' final decision making.

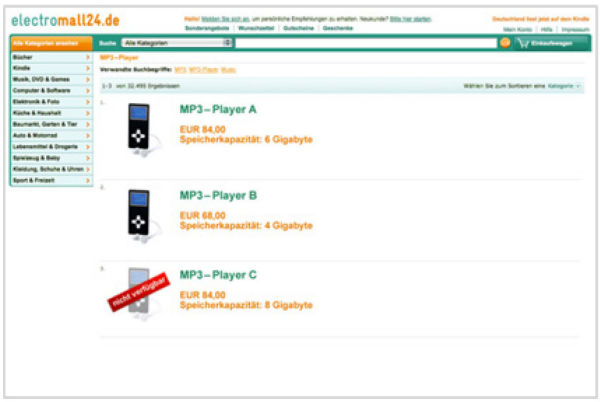
Appendices

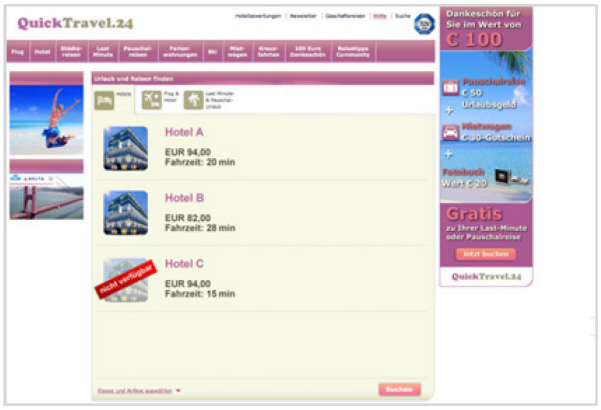
Appendix 5.1 Computer Screen Control Group



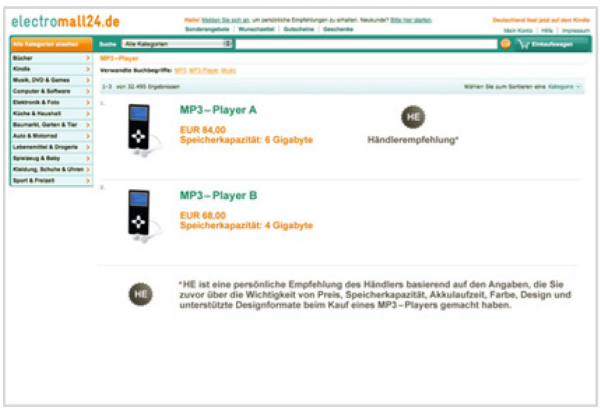


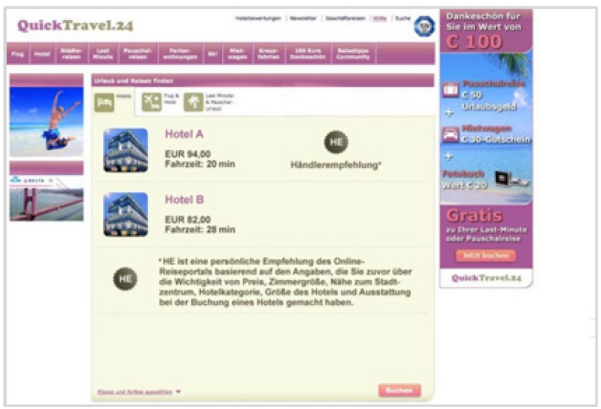
Appendix 5.2 Computer Screen Experimental Group 1



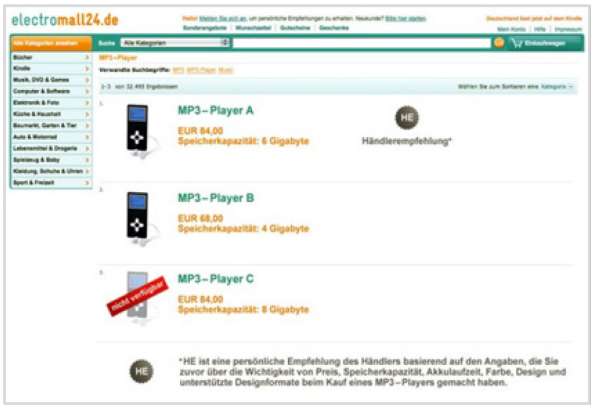


Appendix 5.3 Computer Screen Experimental Group 2





Appendix 5.4 Computer Screen Experimental Group 3



6 WHAT DRIVES HOUSEHOLDS' PREFERENCE FOR ORGANIC PRODUCTS: VALUES OR ATTITUDES? (ESSAY 5)

Jana Luisa Diels

Working Paper

Abstract

This paper seeks to corroborate the prevailing contention found in experimental research that households' preference for organic products is primarily driven by health and environmental motives. To this end, it is the first to integrate comprehensive panel data and households' self-reported attitude and value measures. PLS structural equation modeling reveals a positive relationship between customers' attitudes towards organic products and their relative preference for buying them throughout all tested categories. Yet, there is no support for a direct effect of health and environmental consciousness on households' organic preference structure. Rather, the influence of both measures is significantly and fully mediated by individuals' attitude towards organic items. The results provide a greater and more realistic understanding of what drives green consumption behavior, consequently leading to valuable implications for marketing practice.

6.1 Introduction

The market for organic products is one of the most promising in international food retailing with average growth rates of 9.0% (BÖLW, 2013) and an overall sales volume of USD 62.9 billion in 2011 (Willer, Lernoud, & Home, 2013). Yet, despite its continuous expansion, the market's absolute size remains rather small with only a 3.7% share of total sales (BÖLW, 2012). In addition, after a considerable acceleration, some retailing branches, like discounters or drugstores, have already registered a decline in the overall sales volume of organic items (Sebralla, 2012). Still, marketing organic products constitutes an attractive and profitable retailing strategy since, as a reaction to repeated food scandals, customers have shown an increased awareness of issues such as food safety or food origin (e.g., Williams & Hammitt, 2001) and have further been demonstrated to pay substantial price premiums for so-called green products (e.g., Batte, Hooker, Haab, & Beaverson, 2007). Against this background, the necessity to better understand decision-making vis-à-vis organic products is underlined as it enables marketers to more efficiently address current and prospective customers' needs, thereby fostering further growth of the organic industry.

Over the last years, green purchasing behavior has inevitably caught researchers curiosity and numerous studies on the drivers of organic consumption have emerged (e.g., Ngobo, 2011; Tarkiainen & Sundqvist, 2009). While, on the one side, these studies focus on customer specific barriers to explain the still existing gap between the rising popularity of green products and stagnating sales (Padel & Foster, 2005; Vermeir & Verbeke, 2006); on the other side, researchers' interest in values, beliefs and motives to induce organic consumption has grown remarkably (e.g., Aertsens, Verbeke, Mondelaers, & Van Huylenbroeck, 2009; Tarkiainen & Sundqvist, 2009). As for the latter, health consciousness and environmental concerns have been uncovered to be the main motivational drivers for purchase decisions for organic items (e.g., Magnusson, Arvola, Koivisto Hursti, Åberg, & Sjöden, 2003; Schifferstein & Oude Ophuis, 1998).

Although existent studies have provided valuable insights on what governs green purchasing behavior, the findings' generalizability can be considered somewhat limited since primarily quantitative approaches, like focus groups or laddering interviews, are applied (Lockie, Lyons, Lawrence, & Grice, 2004; Padel & Foster, 2005; Zanoli & Naspetti, 2002) or the attained results are based on reported buying behavior and stated purchase intentions (e.g., Kim & Chung, 2011; Michaelidou & Hassan, 2007; Tarkiainen & Sundqvist, 2009). While

these methods undoubtfully bear advantages in explorative research, they mostly fail to fully display the complex interplay of attitudinal drivers and actual purchase behavior, since health consciousness and environmentally friendly conduct are prone to underlay a social desirability bias and respondents might not act on their stated behavior when making real buying decisions (Ngobo, 2011; Prasad, Strijnev, & Zhang, 2008). Hence, what is missing so far is a more holistic approach (Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007), where information on customers' attitudes is matched to real purchase data. The current research endeavors to fill this gap. To this end, it is – to the best of the author's knowledge – the first to successfully integrate comprehensive panel data to households' self-reported attitudes and value measures thereby aiming to corroborate the contention that customers' preference for organic products, i.e. their relative probability to purchase, can be deducted from health and environmental motives. This, in turn, allows for the provision of a greater and more realistic understanding of what drives individuals' green consumption behavior and the deduction of valuable implications for marketing practice.

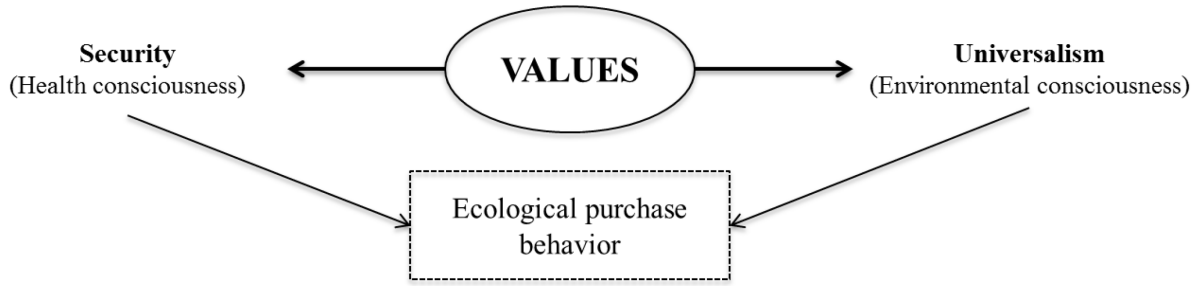
6.2 Development of a Research Model

The unambiguous majority of research pertaining to understanding organic consumption identifies health consciousness to be the primary reason for customers to select green products (e.g., Chinnici, D'Amico, & Pecorino, 2002; Kriwy & Mecking, 2012; Schifferstein & Oude Ophuis, 1998). Particularly, health consciousness (hereafter: *HC*) is defined as individuals' proneness to engage in health actions. As such, health conscious consumers exhibit greater health motivation in that they acknowledge the effect of dietary intake on their health and further engage in preventive health behaviors, e.g. exercise (Newsom, McFarland, Kaplan, Huguet, & Zani, 2005; Moorman & Matulich, 1993). In the same vein, environmental consciousness (hereafter: *EC*) ranges among the primary determinants guiding customers to buy organic products (e.g., Magnusson et al., 2003; Paladino, 2005; Schifferstein & Oude Ophuis, 1998). As such, *EC* is understood as individuals' concern for ecological issues and the overall intention to undertake actions concerning the preservation of the environment.

Both *HC* as well as *EC* can be understood as distinct customer values pertaining to specific value systems differentiating organic buyers from non-buyers (Schifferstein & Oude Ophuis, 1998). Particularly – and in accordance with Schwartz's inventory system (1992) - concern about one's health can be assigned to security values while environmental awareness

tends to be related to the universalistic value domain (Aertsens et al., 2009; Collins, Steg, & Koning, 2007). This is especially interesting insofar as it suggests that although *HC* and *EC* lie on oppositional sides of the value spectrum (see Figure 6.1), they seem to collapse into the same lifestyle approach when individuals conciliate their egoistic motives for a healthy conduct of life with the altruistic motives to protect the environment in the scope of ecological purchase behavior.

Figure 6.1 Conceptual Model



In general terms, values are defined as relatively stable concepts or beliefs about some desirable end-state or goal which serve as guiding principles in life as they help individuals in evaluating, choosing and justifying actions and behaviors (Bilsky & Schwartz, 1994; Schwartz, 1992). In other words, values have motivational content in that they express the goals which motivate people to exhibit a certain behavior (Schwartz, 1994; Vermeir & Verbeke, 2006). Although values are deemed good criteria to predict individuals' conduct (Krystallis, Vassallo, Chryssohoidis, & Perrea, 2008), empirical evidence finds low statistical relations between both constructs (Brunsø, Scholderer, & Grunert, 2004; Collins et al., 2007; Munson, 1984). What follows is that organic purchase behavior might also not be directly predictable by *HC* and *EC* but that a broader approach is needed.

H1: HC and EC, as underlying customer values, do not have a direct effect on customers' preference for organic products.

Values have commonly been shown to affect individuals' behavior through attitudes concerning different actions or entities (e.g., Fishbein & Ajzen, 1975; Homer & Kahle, 1988; Maio & Olson, 1995). Following a hierarchical structure, values, as extremely stable and robust constructs, are assumed to impact attitudes, which, in turn, affect people's actions. Particularly, studies demonstrate that attitudes towards food choices are significantly

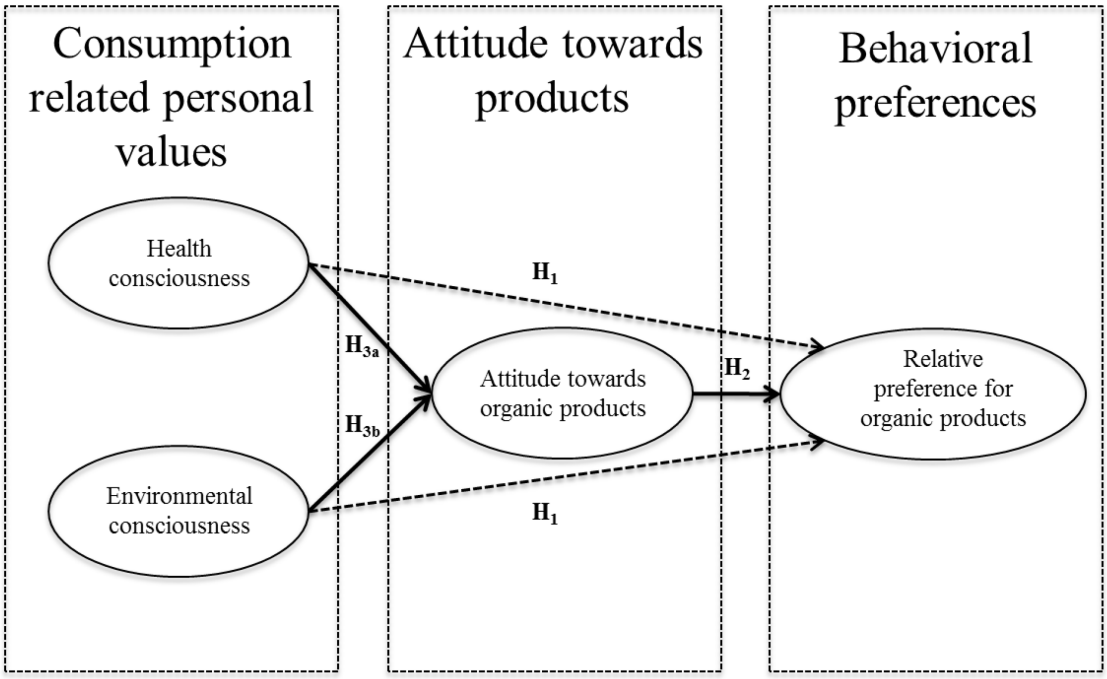
impacted by underlying values structures (de Boer, Hoogland, & Boersema, 2007; Dreezens, Martijn, Tenbült, Kok, & de Vries, 2005). Applying this line of reasoning to customers' organic purchase behavior, it follows that values, such as *HC* and *EC*, might also not impact green purchase decisions straightforwardly but take a detour through first affecting peoples' attitudes (Tarkiainen & Sundqvist, 2009). Keeping with Ajzen and Fishbein's (1977) claim for increased correspondence between attitudinal and behavioral measures, it is hence concluded that:

H2: Customers' attitude towards organic products positively affects their preference for them.

H3a: The effect of HC on customers' preference for organic products is mediated through their attitude towards these products.

H3b: The effect of EC on customers' preference for organic products is mediated through their attitude towards these products.

Figure 6.2 Research Model



The relationships, depicted in Figure 6.2, can be understood as the core research model this paper endeavors to analyze. In addition, several control measures should be integrated in the model which can be assumed to significantly affect attitude and preference for organic

items. Firstly, individuals' *income* (e.g., Ngobo, 2011; Schifferstein & Oude Ophuis, 1998) should be considered, since low monthly earnings might constrain behavioral preferences for buying organic products despite favorable attitudes. Further, the influence of the *number of children in the household* (e.g., McEachern & Willock, 2004) should be assessed, as it seems probable that customers with children pay more attention to health and environment-related issues and, hence, have a greater tendency to purchase green products. On the other hand, a large number of children in the household might increase overall monetary restrictions, wherefore households with many children might have positive attitudes towards organic products but not the monetary means to purchase them. Also, customers' likelihood for organic consumption has been shown to greatly depend on availability (Padel & Foster, 2005; Paul & Rana, 2012). Consequently, *city size* is included as control measure since availability can be assumed to be better in larger cities. Finally, the model accounts for respondents' *age* (e.g., Magnusson, Arvola, Koivisto Hursti, Åberg, & Sjöden, 2001). On the one hand, older customers with presumably more money could care more about buying products which have been manufactured in environmentally friendly ways. On the other hand, organic consumption might be interpreted as a trendy way of life wherefore predominantly younger customers exhibit green purchase patterns.

6.3 Research Methods

6.3.1 The Data

In sharp contrast to existent empirical work on green purchase drivers, the current research is the first to work with data on real purchase behavior inclusive of attitudinal measures from the same test population. More precisely, the study employs data from the 2006 GfK SE household panel, which comprises over 20,000 representative panel households, who give information about their self-reported purchase history, as well as on household-specific demographics and attitudinal measures concerning various topics.

In total, the data includes information from 192 retailers of 12 different retail branches (e.g., supermarkets, discounters, drugstores) in 56 product categories. Out of these categories, five were selected for the further analysis: With regard to food products, butter, milk and yogurt were chosen as test categories as these products ranged among the ten organic products with the highest share of total sales in 2007 in Germany (BÖLW, 2008) and had a sufficient

number of organic brands within the panel. Further, two non-food categories, i.e. soap and face care, were included. In Germany, natural cosmetics registered an average growth rate of 7% (4.9%) for branded (unbranded) products in 2010 (Will, 2011). Further, the market for natural cosmetics is estimated to reach a market value of USD 19.2 billion by 2015 in the US (Transparency Market Research, 2011). These numbers and empirical research demonstrating that purchase drivers for organic non-food items might differ from those of food products (Kim & Chung, 2011) emphasize the need to increase research activities in this domain.

To determine organic purchases within the data set, a comprehensive internet research of all included brand names was conducted to differentiate organic from non-organic products. Based on this, first, only those panel members were selected for further analysis with at least one organic purchase in one of the five analyzed product categories. Since purchase incidents of organic products constitute rare events in the data set, which in turn might lead to biased estimates, a choice-based sampling of all non-buyers was performed as suggested by King and Zeng (2001). Particularly, a random sample of non-buyers with approximately the same sample size was drawn and both sub-samples were matched.

6.3.2 Measures

To operationalize the applied constructs, the study followed Rossiter's (2002) request for a content-driven selection of items. Particularly, all those indicators were chosen from the GfK household panel which were conceptually necessary to define the latent variables deemed to be studied. To this end, both demographic information on panel members as well as different attitudinal measures were employed. A detailed description of all constructs and corresponding items can be found in Appendix 6.1.

Individuals' concern for a healthy conduct of life was compounded by three distinct constructs to differentiate between people's general *health consciousness (HC)*, the perceived importance of *keeping their body in good shape* (*BOD*) as well as their *preference for an active lifestyle* (*ACT*).

Environmental consciousness (*EC*) was measured via five items to assess the degree of respondents' involvement with general environmental issues as well as their proneness to engage in ecological actions in everyday life.

Attitude towards organic products (*AORG*) was operationalized by seven items to reveal individuals' perceived favorability of organic products over regularly produced items.

Customers' *relative preference for organic products* (*PORG*) was estimated by computing the quotient of the number of organic purchases and the total amount of purchases exhibited in one product category. The continuous variable attained was further transformed into an ordinal measure with three preference intensity groups named *no-buyers* (0% organic purchases in one category), *light organic buyers* (up to 20% organic purchases in one category) and *heavy organic buyers* (more than 20% organic purchases in one category). Table 6.1 shows the distribution of preference intensity groups per category.

Table 6.1 Distribution of Organic Preference Intensity (in %)

	Butter (n=467)	Milk (n=720)	Yogurt (n=1327)	Soap (n=198)	Face care (n=434)
No-buyers	46.7	50.1	50.1	50.5	50.7
Light buyers	32.5	31.7	36.9	7.6	6.9
Heavy buyers	20.8	18.1	13.0	41.9	42.4

Additionally, household per-capita income (*PCincome*), number of children in the household (*nochild*), city size (*citys*) and age of household leader (*ageHHl*) were included as control measures.

6.4 Results

6.4.1 Testing the Measurement Structure

Cronbach's alpha (α), composite reliability (p_j) and average variance extracted (*AVE*) (see Appendix 6.2) were used to assess the reliability and validity of the employed measures. As displayed in Table 6.2[8], the reliability indicators revealed a high internal consistency among the employed items. As such, Cronbach's α values exceeded the 0.80 threshold suggested by Rossiter (2002) with regard to *AORG* and *HC* and lay well above the cut-off value of 0.70 proposed by Nunnally (1978) concerning *EC*. Although the α's for measuring active lifestyle (*ACT*) and concern with body shape (*BOD*) were smaller (both 0.54), the constructs yielded satisfactory results with regard to composite reliabilities (p_j's), exceeding the recommended level of 0.70 (Bagozzi & Edwards, 1998) and consequently remained in the model. The

[8] Note that the presented numbers refer to the aggregated measures over all product categories. Individual construct reliabilities and validities, as well as latent variable correlations per product, are displayed in Appendix 6.3 and Appendix 6.4.

respective p_j values for *AORG*, *HC* and *EC* all were greater than at least 0.81, hence meeting reliability requirements.

Table 6.2 Construct Reliabilities and Validities (α, p_j and *AVE*)

ACT	*BOD*	*HC*	*AORG*	*EC*
α=0.54	α=0.54	α=0.81	α=0.82	α=0.72
p_j=0.74	p_j=0.81	p_j=0.86	p_j=0.88	p_j=0.81
AVE=0.50	*AVE*=0.68	*AVE*=0.46	*AVE*=0.59	*AVE*=0.47

With regard to construct validity, the average variance extracted (*AVE*) approached the designated threshold value of 0.5 (Fornell & Larcker, 1981) throughout all measures, pointing to satisfactory convergence validity. Further, discriminant validity was assessed by comparing each construct's *AVE* to its squared correlation with all other constructs (see Table 6.3). Since, for all measures, the *AVE* value exceeded the respective squared factor correlations, the Fornell-Larcker criteria (1981, see Appendix 6.2, Formula 4) was met and discriminant validity could be assumed.

Table 6.3 Latent Variable Correlations

	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.33	0.21	0.18	0.05	0.03
EC	0.58	1.00	0.02	0.07	0.02	0.00
HC	0.46	0.16	1.00	0.03	0.04	0.25
PORG	0.42	0.27	0.17	1.00	0.01	0.00
ACT	0.22	0.13	0.20	0.08	1.00	0.03
BOD	0.16	0.01	0.50	0.01	0.18	1.00

* Squared factor correlations are displayed above the main diagonal

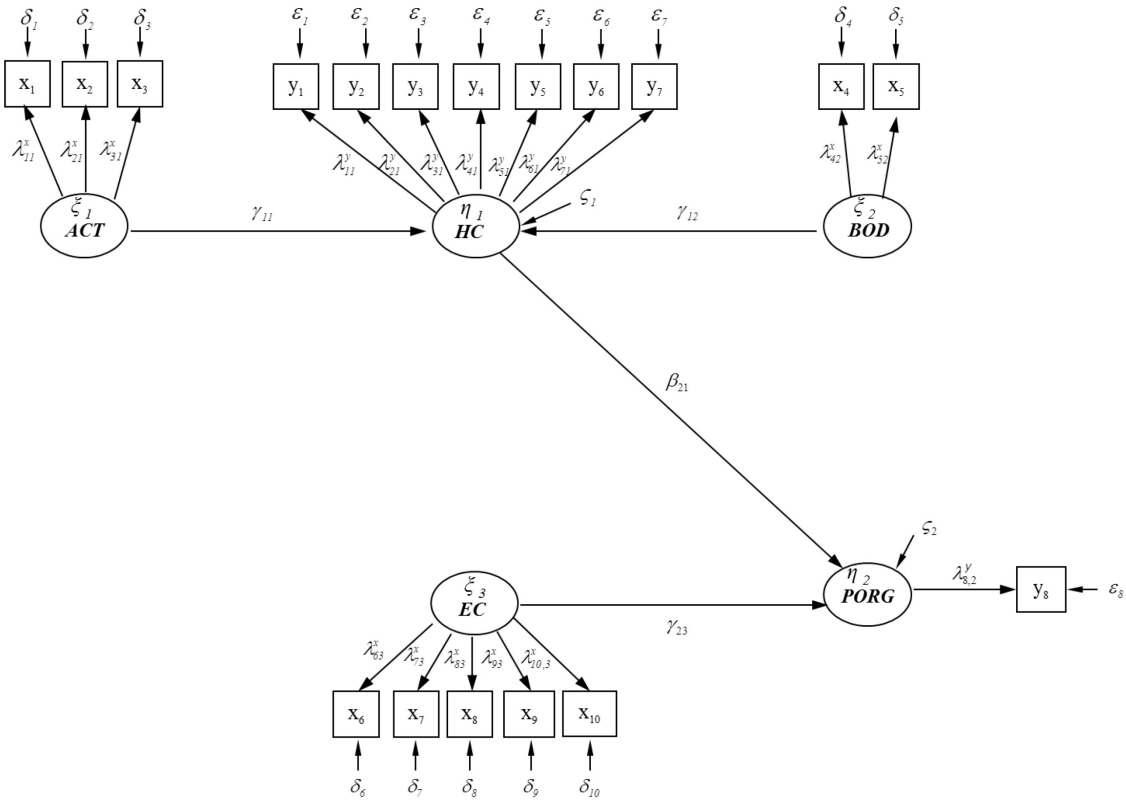
6.4.2 Testing the Structural Model

In order to test the deducted hypotheses, PLS structural equation modeling, an approach which maximizes the variance between the included constructs through a number of subsequent ordinary least square (OLS) regressions (Reinartz, Haenlein, & Henseler, 2009; Temme & Kreis, 2005), was used. The analysis followed a two-step approach: First, the direct effect of *HC* and *EC* on individuals' preference for buying organic products was modeled. Subsequently, customers' attitudes towards organic products were included as a mediating construct to compare the results of the basic and the respective complete structural model.

6.4.2.1 The Basic Structural Model

Figure 6.3 depicts the basic structural model with direct paths from *HC*, i.e. health consciousness, and *EC*, i.e. environmental concern, to individuals' exhibited preference for organic products.

Figure 6.3 Basic Structural Model for Organic Purchase Preference



The standardized path coefficients, as well as f^2 and q^2 effect sizes for the basic model, are summarized in Table 6.4. According to Chin (1998a), in PLS-models, coefficients with values greater than 0.2 indicate a substantial relationship between accordant constructs. Together with the attained *p*-values, it thus shows that health consciousness is not a direct antecedent of individuals' preference for organic products, thereby confirming H1 for all product categories. This result is further sustained by the respective f^2 and q^2 effect sizes. As such, the f^2 effect measures – as indicators of the influence of a specific predictor construct on an endogenous construct (Hair, Hult, Ringle, & Sarstedt, 2013) – between *HC* and *PORG* prove to be significantly small, pointing to a minor impact of *HC* in producing the R^2 of *PORG* throughout all categories. Likewise, the q^2 effect sizes – as a measure of the predictive

relevance of a specific construct on an endogenous construct (Hair et al., 2013) – only slightly exceed the designated threshold of 0.00, hence underlining that health consciousness is only a minor direct predictor of individuals' preference for organic products.

Table 6.4 Path Coefficients, f^2 and q^2 Effect Sizes for the Basic Model

		Butter	Milk	Yogurt	Soap	Face care
ACT → HC	γ_{11}	0.117	0.160	0.075	0.075	0.140
	f^2	0.011	0.028	0.006	0.008	0.020
	q^2	0.006	0.012	0.003	0.001	0.009
BOD → HC	γ_{12}	0.505**	0.473**	0.521**	0.514**	0.483**
	f^2	0.309	0.276	0.341	0.319	0.294
	q^2	0.121	0.096	0.132	0.140	0.100
EC → PORG	γ_{23}	0.354**	0.344**	0.281**	0.176	0.113
	f^2	0.142	0.153	0.084	0.050	0.037
	q^2	0.150	0.177	0.086	0.096	0.052
HC → PORG	β_{21}	0.032	0.125	0.079	0.184	0.192
	f^2	-0.001	0.016	0.006	0.033	0.034
	q^2	0.006	0.022	0.006	0.037	0.033

** *p*-values <0.05

Yet, with regard to environmental consciousness, the data reveals an oppositional result, uncovering a significant direct positive effect of people's concern with environmental issues to their exhibited relative inclination for buying organic items. Accordingly, the analysis yields medium f^2 and q^2 effect sizes, thereby further substantiating *EC*'s relevance in predicting relative preferences for buying organic products. However, these results are not corroborated for personal care products, i.e. soap and face care, where there is no significant relationship and accordant small effect sizes.

As additional result, it shows that while concern with one's body significantly increases health conscious conduct, the tendency to lead an active life is not a predictor of individuals' tendency for health conscious behavior.

Table 6.5 summarizes the R^2 and Q^2 values of the included endogenous constructs of the basic structural model. It shows that the model's predictive accuracy is satisfactory with regard to the *HC* measure, since approximately 30% of the construct's variance can be explained by the related exogenous variables (cf. Chin, 1998b). Likewise, the respective Q^2 values are substantially different from zero, indicating a satisfactory predictive relevance of the model with regard to health consciousness. Yet, and in accordance with the

aforementioned results, the low R^2 values for *PORG* suggest that the included exogenous measures only account for a small fraction of the construct's variance.

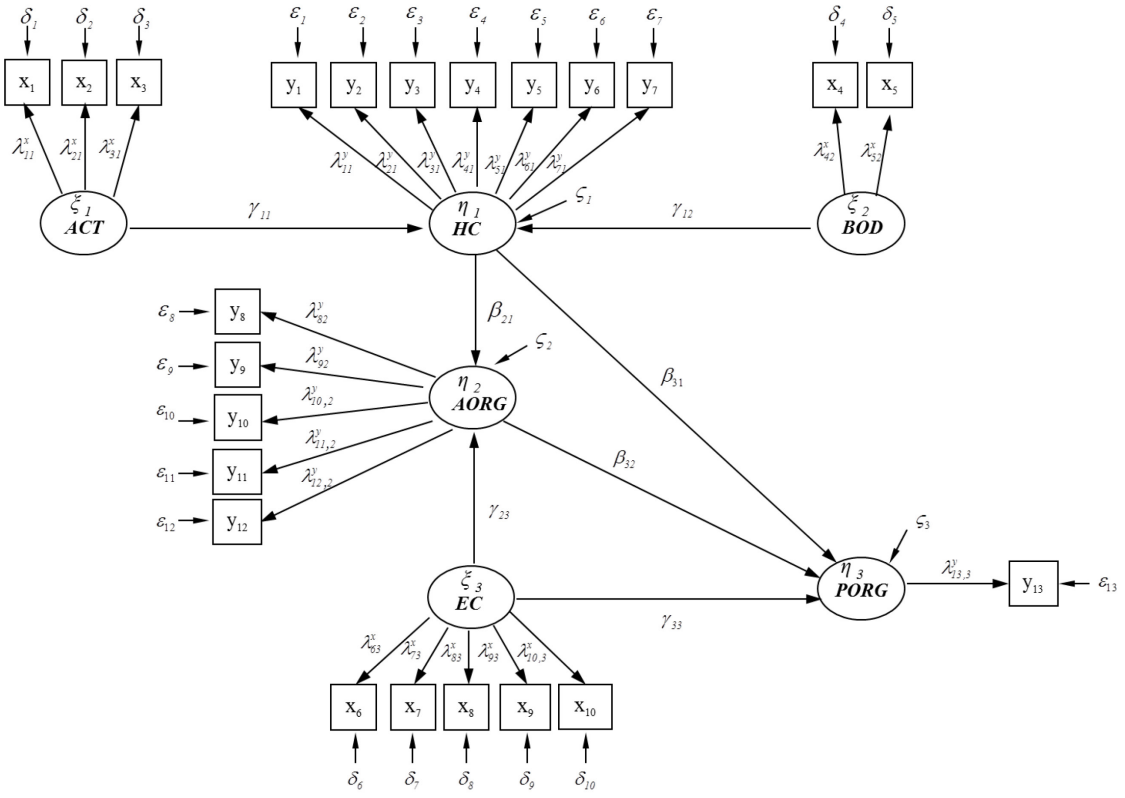
Table 6.5 R^2 and Q^2 Values for the Basic Model

		Butter	Milk	Yogurt	Soap	Face care
HC	R^2	0.281	0.278	0.291	0.290	0.274
	Q^2	0.128	0.124	0.133	0.137	0.120
PORG	R^2	0.136	0.163	0.094	0.090	0.059
	Q^2	0.144	0.166	0.095	0.118	0.059

6.4.2.2 The Complete Structural Model

Figure 6.4 displays the complete model with individuals' attitudes concerning organic products as a mediator variable between health and environmental consciousness and the exhibited green purchase behavior.

Figure 6.4 Complete Structural Model for Organic Purchase Preference



The PLS results (see Table 6.6) support most of the hypotheses. As such, it becomes evident that customers' attitudes towards organic products significantly affect their preference for these types of goods in all tested categories (H2). Hence, the more favorable customers consider organic items to be, the more likely they are to eventually purchase them. Yet, despite significant path coefficients, this relationship proves to be weaker for personal care than for food products. Here, both f^2 and q^2 effect sizes are only marginally different from zero, suggesting that the predictive value as well as the predictive relevance of customers' organic attitudes on their final buying preference is less pronounced for personal care products than in food categories.

Table 6.6 Path Coefficients, f^2 and q^2 Effect Sizes for the Complete Model

		Butter	Milk	Yogurt	Soap	Face care
ACT → HC	γ_{11}	0.137	0.179	0.091	0.080	0.156**
	f^2	0.020	0.038	0.009	0.008	0.028
	q^2	0.006	0.012	0.003	0.000	0.010
BOD → HC	γ_{12}	0.467**	0.447**	0.501**	0.501**	0.447**
	f^2	0.272	0.252	0.324	0.317	0.253
	q^2	0.119	0.104	0.132	0.129	0.101
EC → AORG	γ_{23}	0.584**	0.500**	0.500**	0.515**	0.459**
	f^2	0.658	0.437	0.426	0.581	0.404
	q^2	0.266	0.186	0.177	0.228	0.168
EC → PORG	γ_{33}	-0.040	0.087	0.067	-0.004	-0.063
	f^2	0.001	0.007	0.006	-0.000	0.004
	q^2	0.007	0.007	0.007	0.008	0.001
HC → AORG	β_{21}	0.313**	0.349**	0.362**	0.392**	0.455**
	f^2	0.222	0.201	0.208	0.333	0.360
	q^2	0.085	0.081	0.158	0.119	0.149
HC → PORG	β_{31}	-0.111	-0.018	-0.046	0.076	0.101
	f^2	-0.006	-0.002	-0.001	0.005	0.005
	q^2	0.006	0.004	-0.001	0.011	0.009
AORG → PORG	β_{32}	0.635**	0.495**	0.410**	0.311**	0.250*
	f^2	0.284	0.191	0.115	0.044	0.030
	q^2	0.283	0.184	0.024	0.039	0.037

** *p*-values <0.05, * *p*-values <0.10

In addition, the data evidences significant positive path coefficients between both value constructs, i.e. *HC* and *EC*, and individuals' attitudes towards organic products. In other

words, customers with strong concern for their health and for the environment also tend to have a positive attitude towards products which are produced using environmentally friendly methods. Judging from the attained f^2 and q^2 effect sizes, this effect seems to be more pronounced for environmental than for health consciousness, implying that environmental concerns play a more decisive role in shaping customers' green attitudes than health related issues.

Yet, what is interesting is that the direct paths from *HC* and *EC* to customers' relative preference for green products are insignificant, pointing to a mediating effect of the organic attitude construct. The results of a comprehensive mediation analysis confirm this contention, revealing that indeed the effect of *HC* and *EC* on the relative preference for buying organic products is significantly and fully mediated by one's attitude towards these items (see Table 6.7; H3a and H3b). However, the mediation is weaker for cosmetic products, especially for face care items. This result does not come as a surprise given the delineated significant but small impact of organic attitudes on final preference for organic personal care products. Apparently, environmental as well as health consciousness do significantly shape customers' attitudes for organic products but do not necessarily transform into real buying preferences in personal care categories. Demographic factors, like income, number of children in the household, age of household leader and city size, however, fail to explain this revealed attitude-behavior gap. As such, there is no significant influence of the included control variables either on individuals' attitudes towards or preference for organic products (all *p's*>0.05, with only $p_{Soap}^{PC\_Income \rightarrow AORG}$<0.05).

Table 6.7 Results of Mediation Analysis

	HC		EC	
	Sobel test statistic	*p*-value	Sobel test statistic	*p*-value
Butter	2.847	0.00	4.821	0.00
Milk	2.796	0.01	3.745	0.00
Yogurt	2.354	0.02	2.763	0.01
Soap	1.844	0.07	1.934	0.05
Face care	1.862	0.06	1.853	0.06

Table 6.8 summarizes the attained R^2 and Q^2 values of the incorporated endogenous constructs. It shows that individuals' attitudes towards organic products (*AORG*) are satisfactorily captured by the model: As such, the included exogenous variables can explain approximately 50% of the construct's variance. Further, the Q^2 values are substantially different from zero, corroborating the model's large predictive relevance with regard to the

attitude construct. In addition, the comparison of the results of the full and the basic model demonstrates that the introduction of the mediating *AORG* construct has significantly improved the predictive accuracy, as well as predictive relevance, of the model with regard to *PORG*. Particularly, the respective R^2 and Q^2 values have doubled in all food categories and likewise show a small but unambiguous increase for all personal care products.

Table 6.8 R^2 and Q^2 Values for the Complete Model

		Butter	Milk	Yogurt	Soap	Face care
HC	R^2	0.253	0.262	0.277	0.279	0.246
	Q^2	0.121	0.121	0.130	0.128	0.111
AORG	R^2	0.521	0.482	0.455	0.591	0.529
	Q^2	0.300	0.277	0.251	0.355	0.305
PORG	R^2	0.327	0.300	0.187	0.129	0.087
	Q^2	0.333	0.300	0.186	0.152	0.093

6.5 General Discussion

An unambiguous shortcoming of extant research pertaining to understanding customers' decision making vis-à-vis organic products is that it mostly has quantitative character or is based on individuals' reported purchase intentions. Yet, self-explicated intentions must not necessarily transform into real purchase behavior wherefore the predictive power of the so far attained results and the deducted practical implications for marketers are challengeable. As a consequence, the need to study real purchase data to gain a more thorough understanding of what really drives customers' purchase decisions for organic items is stressed.

The current study aims to fill this gap by being the first to successfully integrate attitudinal and value measures with real organic purchase data. More precisely, it seeks to corroborate the prevailing contention that purchases of organic products are mainly driven by individuals' consciousness for health and environmentally related issues. To this end, PLS structural equation modeling is used to analyze the specific interplay of health and environmental consciousness and customers' preference for buying green products in five categories.

The analysis reveals a positive relationship between attitudes towards organic products and customers' relative preference for buying them throughout all tested categories. That is,

the more favorable a person perceives organic items in contrast to normally produced products, the more likely this person is to eventually put them in the shopping basket. Further, it shows that the preference for buying organic items is indeed influenced by individuals' concern for their health and the environment but that this influence is only of indirect nature. As such, the results demonstrate that the impact of both health as well as environmental consciousness on relative preferences for organic products is significantly mediated by individuals' attitudes towards these products. That is, customers with strong concern for their health and for the environment also tend to have a positive attitude towards environmentally friendly products. However, these customers do not necessarily exhibit an increased probability of actually buying them. These results suggest that customers might be well aware of the fact that - opposed to widespread belief - there is no scientific proof that organic products are indeed healthier (Smith-Spangler et al., 2012). Also, the findings suggest that customers might doubt that organic products are truly produced with less harm to the environment, possibly due to repeated food scandals, also in the organic food sector.

Overall, these findings prove to be robust throughout all product categories, though with weaker relations for personal care than for food products. While, also in personal care categories, health and environmental concern significantly influence positive attitudes towards organic products, these favorable attitudes transform into final purchase decisions to a far smaller extent than in food categories. Since personal care products represent an emerging product category in the organic market, customers might possibly still be insecure about what really defines green personal care products or have difficulties in distinguishing them from ordinarily produced articles, wherefore there are less likely to be selected despite favorable attitudes.

The illustrated findings contribute to retailing research in many ways: Primarily, they suggest that retailers, who wish to foster higher sales of organic products, might not need to address customers' awareness for health or environmentally related topics, but should instead try to directly support the formation of positive attitudes towards organic items. This can be interpreted a positive result for retailers since values are understood as very stable and abstract constructs (Bilsky & Schwartz, 1994), which might be harder to influence and eventually change than individuals' attitudes. Particularly, the advantages of green products should be precisely carved out, thereby increasing the perceived benefits for the customer. As such, retailers as well as manufacturers should make use of customers' accentuated awareness for product ingredients and justifiable production processes, e.g. emphasize that green

products are free of additives and not genetically engineered, to bring about changes in attitude through profound knowledge. Labels, which help customers to identify organic products, can be considered a good starting point. Yet, these labels need to be more strongly linked to specific information on organic characteristics to induce the intended associations, which eventually shape positive attitudes towards green items.

In addition, the results demonstrate no significant effect of individuals' incomes on the relative propensity to buy organic items. This implies that – given positive attitudes - customers are willing to spend relatively large parts of their earnings on organic products. Consequently, retailers might consider not offering organic private brands at too low prices to ensure sufficient profits and further to not deteriorate the perceived quality of their products.

The study is not free of limitations, which offer avenues for further research: Firstly, the data set lacks information on product prices as well as information on other marketing variables, wherefore their effect to induce change in relative preference and, consequently, market share for organic products cannot be studied. Future research is encouraged to extend the work with realistic shopping data to uncover additional drivers of organic purchase decisions and assess the impact of different marketing mix variables to enhance the predictive power of the presented model. In this regard, it should particularly consider the interplay with psychographic factors like customers' price consciousness, their deal proneness or variety seeking tendencies to better understand green decision-making and further differentiate organic buyers from organic non-buyers. Moreover, it should seek to expand the knowledge on additional attitudinal constructs impacting green consumption such as, for instance, preferences for local products, attitudes towards genetically modified produce or sustainable consumption in general (Balderjahn, Peyer, & Paulssen, 2013). This way, the picture of the organic consumer can be more explicitly shaped, hence assisting practitioners to accurately address current and prospective clients.

Secondly, the research finds a positive relation between attitude towards and preference for organic items. Since empirical studies report that the majority of customers hold positive green attitudes (e.g., Magnusson et al., 2001), questions arise as to why sales numbers still remain small and what prevents people from purchasing organic products. According to the empirical results, demographic variables do not constitute a decisive barrier wherefore follow-up research is encouraged to more thoroughly assess other hindrances for organic purchases. For instance, it seems probable that a lack of knowledge about what really defines organic products or insecurities concerning labeling standards deter people from purchasing organic

products despite general positive attitudes. Also, customers might hold positive attitudes but simply be unable to tell apart organic and non-organic products.

Finally, future research should check the robustness of the results in additional product categories. In this regard, it seems especially worth it to analyze purchase decisions for organic clothes since these decisions can be assumed to be less automatic and more involving than purchase decisions for daily grocery products. Consequently, the respective purchase drivers might also differ. In addition, decision making for organic home care products can be expected to deviate from the reported results since, possibly, motives to protect the environment play a dominant role when buying home care products whereas health related issues retreat into the background.

Appendices

Appendix 6.1 Operational Measures

ACT - Active lifestyle (1="strongly disagree", 5="totally agree")

x_1: I exercise on a regular basis
x_2: In everyday life, I like to walk
x_3: In everyday life, I like to bike

BOD - Concern with body shape (1="strongly disagree", 5="totally agree")

x_4: I care a lot about my figure
x_5: I do not mind consuming more than a certain amount of calories

HC – Health consciousness (1="strongly disagree", 5="totally agree")

y_1:I avoid food with a lot of fat
y_2:I prefer a bland diet
y_3: I avoid food with additives
y_4: I need to watch my health when eating
y_5: I avoid food that is bad for my health
y_6: I avoid food with a lot of sugar
y_7: I prefer low carb products

AORG - Attitude towards organic products (1="strongly disagree", 5="totally agree")

y_8: When buying food, I prefer organic products
y_9: I am willing to pay a price premium for organic products
y_{10}: I have shopped at organic shops
y_{11}: I try to buy products which do not harm the environment
y_{12}: When buying personal care and household products, I prefer organic products
y_8: When buying food, I prefer organic products
y_9: I am willing to pay a price premium for organic products

EC - Environmental consciousness (1="strongly disagree", 5="totally agree")

x_6: Nature is more important than economic growth
x_7: I forgo absolute cleanness for the sake of the environment
x_8: I am willing to pay a price premium for environmentally friendly packaging
x_9: I think nowadays people care too little about the environment
x_{10}: Too little is being done for saving nature

PORG – Preference towards organic products (0="non buyer", 1="light organic buyer", 3=" heavy organic buyers")

Household per-capita income (1="499€ - 999€", 2="1000€ - 1999€", 3=">2000")

Number of children in the household (continuous variable)

City size (1=”<20,000 inhabitants”, 2=”20,000-99,000 inhabitants”, 3=”100,000-999,000 inhabitants”, 4=”>1,000,000 inhabitants”)

Age household leader (1=”<30 years”, 2=”30-39 years”, 3=”40-49 years”, 4=”50-59 years”, 4=”> 60 years”)

Appendix 6.2 Assessment of Construct Reliabilities and Validities

Cronbach's alpha (α), composite reliability (p_j), and average variance extracted (AVE) were scrutinized as follows:

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_x^2}\right) \tag{6.1}$$

with

n – number of indicators of a construct

σ_i^2 – variance of indicator i

σ_x^2 - variance of construct x

$$\mathrm{p_j} = \frac{\left(\sum_{\mathrm{j}=1}^{\mathrm{k_j}} \lambda_{\mathrm{ij}}\right)^2 \cdot \phi_{\mathrm{jj}}}{\left(\sum_{\mathrm{j}=1}^{\mathrm{k_j}} \lambda_{\mathrm{ij}}\right)^2 \cdot \phi_{\mathrm{jj}} + \sum_{\mathrm{j}=1}^{\mathrm{k_j}} \theta_{\mathrm{ii}}} \tag{6.2}$$

with

$\mathrm{k_j}$ – number of indicators

λ_{ij} – loading of the i^{th} indicator

ϕ_{jj} – empirical variance of the latent variable ξ_j

θ_{ii} – error variance of the i^{th} indicator

$$\mathrm{AVE_j} = \frac{\sum_{\mathrm{j}=1}^{\mathrm{k_j}} \lambda_{\mathrm{ij}}^2 \cdot \phi_{\mathrm{jj}}}{\sum_{\mathrm{j}=1}^{\mathrm{k_j}} \lambda_{\mathrm{ij}}^2 \cdot \phi_{\mathrm{jj}} + \sum_{\mathrm{j}=1}^{\mathrm{k_j}} \theta_{\mathrm{ii}}} \tag{6.3}$$

with

$\mathrm{k_j}$ – number of indicators

λ_{ij} – loading of the i^{th} indicator

ϕ_{jj} – empirical variance of the latent variable ξ_j

θ_{ii} – error variance of the i^{th} indicator

$$\mathrm{AVE}(\xi_{\mathrm{j}}) \geq \phi_{\mathrm{ij}}; \text{for all } \mathrm{i} \neq \mathrm{j} \tag{6.4}$$

with

$\mathrm{AVE}(\xi_{\mathrm{j}})$ – AVE of factor ξ_{j} according to Formula 3

ϕ_{ij} – squared correlation between $\xi_{\mathrm{j}}$and ξ_{i}

Appendix 6.3 Construct Reliabilities and Validities (α, p_j and AVE) for Distinct Product Categories

Construct	Number of items	Butter	Milk	Yogurt	Soap	Face care
ACT	3	α=0.53	α=0.57	α=0.54	α=0.47	α=0.56
		p_j=0.67	p_j=0.75	p_j=0.74	p_j=0.67	p_j=0.77
		AVE=0.44	AVE=0.50	AVE=0.49	AVE=0.43	AVE=0.53
BOD	2	α=0.54	α=0.51	α=0.54	α=0.51	α=0.53
		p_j=0.81	p_j=0.80	p_j=0.82	p_j=0.81	p_j=0.81
		AVE=0.68	AVE=0.67	AVE=0.70	AVE=0.67	AVE=0.68
HC	7	α=0.82	α=0.80	α=0.81	α=0.82	α=0.80
		p_j=0.86	p_j=0.85	p_j=0.86	p_j=0.87	p_j=0.85
		AVE=0.47	AVE=0.45	AVE=0.47	AVE=0.48	AVE=0.46
AORG	5	α=0.82	α=0.82	α=0.81	α=0.84	α=0.82
		p_j=0.87	p_j=0.88	p_j=0.87	p_j=0.89	p_j=0.88
		AVE=0.59	AVE=0.59	AVE=0.58	AVE=0.62	AVE=0.59
EC	5	α=0.73	α=0.73	α=0.72	α=0.74	α=0.68
		p_j=0.82	p_j=0.82	p_j=0.82	p_j=0.82	p_j=0.79
		AVE=0.48	AVE=0.48	AVE=0.47	AVE=0.49	AVE=0.43

Appendix 6.4 Latent Variable Correlations for Distinct Product Categories

Butter	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.42	0.18	0.31	0.04	0.01
EC	0.65	1.00	0.03	0.12	0.03	0.00
HC	0.43	0.18	1.00	0.03	0.04	0.23
PORG	0.56	0.34	0.16	1.00	0.00	0.00
ACT	0.21	0.17	0.19	0.05	1.00	0.01
BOD	0.08	0.01	0.48	-0.02	0.12	1.00

* Squared factor correlations are displayed above the main diagonal

Milk	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.34	0.22	0.28	0.06	0.01
EC	0.58	1.00	0.04	0.14	0.03	0.00
HC	0.47	0.21	1.00	0.04	0.07	0.23
PORG	0.53	0.38	0.21	1.00	0.02	0.00
ACT	0.24	0.16	0.26	0.15	1.00	0.04
BOD	0.12	0.04	0.48	0.03	0.19	1.00

* Squared factor correlations are displayed above the main diagonal

Yogurt	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.30	0.19	0.18	0.05	0.03
EC	0.55	1.00	0.01	0.08	0.01	0.00
HC	0.43	0.12	1.00	0.02	0.03	0.27
PORG	0.42	0.28	0.14	1.00	0.01	0.00
ACT	0.21	0.09	0.19	0.08	1.00	0.04
BOD	0.17	-0.02	0.52	-0.02	0.19	1.00

* Squared factor correlations are displayed above the main diagonal

Soap	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.37	0.25	0.11	0.04	0.11
EC	0.61	1.00	0.03	0.05	0.05	0.01
HC	0.50	0.18	1.00	0.05	0.05	0.27
PORG	0.34	0.21	0.21	1.00	0.00	0.03
ACT	0.19	0.21	0.22	0.05	1.00	0.07
BOD	0.33	0.11	0.52	0.19	0.27	1.00

* Squared factor correlations are displayed above the main diagonal

Face Care	*AORG**	*EC*	*HC*	*PORG*	*ACT*	*BOD*
AORG	1.00	0.31	0.28	0.07	0.05	0.03
EC	0.55	1.00	0.02	0.01	0.02	0.00
HC	0.53	0.15	1.00	0.04	0.05	0.22
PORG	0.27	0.10	0.21	1.00	0.00	0.00
ACT	0.23	0.15	0.22	0.05	1.00	0.02
BOD	0.19	-0.02	0.47	-0.01	0.15	1.00

* Squared factor correlations are displayed above the main diagonal

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